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THE MADRAS MEDICAL JOURNAL.

JULY 1928.

A PAPER ON RHINOSPORIDIUM READ AT THE SCIENCE CONGRESS, 1926.

BY DR. T. SEETHAPATHY OF KING INSTITUTE.

Rhinosporidium has been classified, in all the text books, among the Sporozoa. It is considered to be a species of the Haplosporidia which are mostly parasites of annelid worms. This is in fact the only species so far known to have been recorded from man.

The members of the order Haplosporidia are characterised (1) by the presence of large spores each with a single big nucleus, (2) by the absence of polar capsules and (3) by a simple type of development.

Rhinosporidium Seeberi has been reported from Argentina, India, Ceylon and Tennessee and was first discovered by Seeber in Buenos Ayres in 1896 from a nasal polypus. The next record of this parasite—if it may still be called one—is that of Kincaly in 1903 from a case of Nasal polypus in a Bengalee in Calcutta. Minchin and Fantham, who carefully studied this polypus, assigned a place to the parasite in the order Haplosporidia, sub-class Neosporidia of the class Sporozoa, Phylum Protozoa. Other cases of human infection with this organism have since been recorded amongst Indian patients by Dr. Nair in 1905, (described by Beattie in 1906) by Castellani and Chalmers in Ceylon, by Ingram and Elliot in 1912, by Kirkpatrick in

1916, by Tirumurthi in 1914, by Wright in 1922 and by Ashworth and Turner in 1923. This organism has been met with by the above authors not only in nasal polypi, but also in growths involving the lachrymal duct, external ear, nasopharynx and penis. With the exception of Ashworth and Turner, all the others have apparently regarded the causative organism to be a sporozoon.

Prof. Ashworth of Edinburgh, who had an excellent opportunity in 1923 of studying this organism from a case of nasal polypus in an Indian student then in Edinburgh, considered that it did not belong to the Sporozoa, but to the lowest fungi—Phycomycetes and would therefore place it in the sub order Chytridineæ. His description of the organism would certainly entitle it to be so placed. He appears to have succeeded in growing the organism in culture although the growth was not profuse.

In April 1926, I had a specimen of a nasal polypus sent for examination, in the usual course from the Government General Hospital. I had a bit cut out for sectioning and utilised the rest for making cultures.

Appearance in section.—A number of sporangia were seen in the section lying embedded in the connective tissue. The fully formed sporangium is spherical or nearly spherical with a chitinous envelope lying embedded in the connective tissue and occasionally in the stratified epithelium. The immature spore has a vesiculated nuclear structure with ill defined Karyosome and Cytoplasm. Some of the ripe spores exhibit nuclear mitosis at various stages. The ripe sporangia are about 20 to 80 diameter and show three zones—

- (1) Near the periphery the immature tiny spores preponderate.

- (2) In the centre are found the ripe spores.
- (3) Between these two are found spores in various stages of development.

Cultural characteristics.—Small bits of the polypoid material were cut and thoroughly washed in saline and planted in different media.

- (1) Glycerine agar.
- (2) Glucose agar.
- (3) Saccharose agar.
- (4) Hay infusion agar.
- (5) Sabourad's medium.

On Hay and Sabourad's media sparse growth occurred in about two weeks. The colonies were irregular, small and smooth with a wavy margin and had the appearance and colour of small droplets of coloured cream spilt on the solid agar surface. A small portion of this growth smeared on a glass slide was stained and examined under the low power of the microscope. A large number of sporangia in different stages of growth and development were seen. The immature sporangium is a nearly spherical body with a very large number of spores lying loosely in the protoplasm material of the cell. A definite chitinous cell wall is present. As growth proceeds, the spores inside the sporangia increase in size and each spore shows a well defined outline, the internal nuclear and Karyosomic structures also becoming visible under the high power. It also revealed the presence of immature and mature spores that had got squeezed out of the sporangia, as also certain clubshaped bodies with nonseptate mycelia emerging from some of the spores. These latter are typical of the class Phycomycete and a familiar example of this class is *Mucor Mucedo*—the parasitic mould that has been known

to develop in external cavities as the Nasopharynx and external ear. The pathogenic types have smaller spores than the non-pathogenic varieties, and grow well at 37°C.

Under the dark ground, the culture shows sporangia in various stages of development and maturity. Attempts at subculturing have been partially successful, the growth obtained being however very tardy and meagre and when a medium quite suitable for its growth has been perfected better results may be obtained.

From the results of the tests carried out by me, I am inclined to agree with Prof. Ashworth in considering the organism to be one of the lower fungi and not a sporozoon.

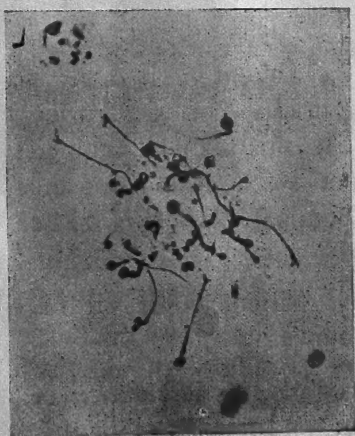
Animal inoculation experiments.—Transmission of the *Rhinosporidium* from the infective material to monkeys had proved negative when it was attempted by Ingram and Dr. Gibson in 1912 and again by Wright and Cunningham in 1922.

Emulsions of the original material from the polypus were again inoculated by me by scarification on to the mucous membranes of monkeys and rabbits and pigeons.

The result in every case was negative. No evidence of any growth, or other reaction either local or general being observed during the six months the animals were kept under observation. Attempts at infecting another set of the same three animals with the culture also proved unsuccessful.

Discussion.—From what has been stated above, the *Rhinosporidium* deserves to be classed amongst the

Protista and not among the Protozoa and is certainly allied to the Phycomycetes. Just how man gets the infection from these fungi is still unknown, but if its position amongst the Phycomycetes is accepted it is quite conceivable in view of their hibernating habits, that it may be air borne, so far as the nasal, lachrymal and nasopharyngeal infections are concerned and may be propagated by contract, in the case of infections of the penis. It has been suggested at any rate by one worker in this field that the Mahammadans whom he treated for such infections of the penis, must have acquired it from the soil through contact with infected brick bits used by them in ablution. But if this theory of infection can be accepted, the failure to infect animals with the cultivated organism or the original infective material, should be explained away on the basis of the organism being pathogenic only to man and not to the lower animals.



CULTURE.



SECTION.

HÆMATURIA.

BY N. MANGESH RAO, F.R.C.S.,

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FOR THE DIAGNOSIS OF HÆMATURIA.—It is essential to demonstrate Erythrocytes by the Microscope, from a fresh specimen of urine after centrifugalising it if necessary. Such an examination of the deposit may show in addition epithelium from different parts of the urinary tract or the presence of bits of a new growth. Chemical and spectroscopic examination may show blood-pigments, which must be distinguished from Hæmoglobinuria. Bacteriological examination of the urine is also to be done.

THE FOUR GLASS TEST.—(1) The first glass receives the washings of the anterior urethra, with sterile normal saline. If this contains any blood a lesion of this part is to be suspected.

(2) Into the second glass the patient voids three or four ounces of urine. Being the first portion of his urine it washes the posterior urethra. If this is blood-stained and that in the third glass not so, a lesion of the Posterior Urethra, Prostate, or Seminal Vesicle is to be suspected.

(3) Into the third glass the patient voids all his remaining urine except the last ounce.

(4) Into the fourth glass he voids the last ounce of urine. In lesions of the Bladder, and the Prostate, this glass would contain almost pure blood "Terminal Hæmaturia."

If the urine is found to be uniformly mixed with blood in the last three glasses it is of Renal origin. A small quantity of blood in the urine of this type renders it "smoky".

If the Anterior Urethra is the sight, first exclude an acute attack of Gonorrhœa, then make an Endoscopic examination to find the cause.

If the Posterior Urethra is suspected, a rectal examination may show the condition of the prostate and the seminal vesicles. A posterior Urethroscopic examination will help in arriving at a diagnosis.

CYSTOSCOPIC EXAMINATION.—By this one can identify almost all the lesions of the bladder, their situation and the type of lesion. If hæmaturia is of renal origin blood may be seen issuing from the Ureteral opening. Lesions round the ureteral opening may help in the diagnosis. Chromocystoscopy, collection ureteral specimen of urine is to be done at the same time.

(A) HÆMATURIA OF RENAL ORIGIN.—The most common cause of this especially when profuse is Renal Tumours. Benign tumours of the kidney are rare; malignant ones are more common.

In children tumour formation is an earlier symptom than hæmaturia, but in adults in 60% of the cases it is the first sign especially in renal carcinoma and papilloma of the renal pelvis. It is difficult to distinguish a benign tumour from a malignant one, clinically and often it is necessary to do an exploration. Malignant growths occur chiefly in children or in adults after 40 and 50.

EMBRYOMA, WILM'S TUMOUR.—Is commoner in children but rare in adult. It shows great variations in

structure with a connective tissue basis and grows to a large size. It is often bilateral. Hæmaturia is a later symptom.

Hæmaturia of Renal origin varies with the type and situation of the neoplasm. In the first stage the venules of the pelvis and calyces become varicose from obstruction to the veins by pressure of the tumour. These may rupture suddenly. In the second stage the pressure of the tumour and the resultant interstitial nephritis cause the Venae Recti of the pyramids to get dilated and bleed. In the third stage the growth invades and ulcerates into the calyces. Hæmaturia is spontaneous, sudden, profuse, and bright red fully mixed with urine. It is not relieved by rest. Colic may be caused by passage of clots or pieces of the growth.

HYPERNEPHROMA.—(Grawitz tumour) forming 70% of renal growths occurs chiefly in adults, but may be met within children and remain latent for some time. Its situation is usually at the upper pole but it also occurs at the lower pole, often subcapsular or in the renal cortex.

Its structure resembles that of the suprarenal cortex and so some consider the tumour to arise from adrenal rests included in the developing kidney. Neither intensification of sex characters occurs nor can *adrenal* be identified in them.

Some others consider it to be an Adeno-papillary Carcinoma of renal origin.

Some others again consider it to be carcinomata arising from "the included Wolffian tubules."

It chiefly attacks adults between 50 and 60, affecting kidneys the subject of chronic interstitial nephritis. The tumour is smooth or faintly labulated, occurs at either

pole and is covered by an expansion of renal capsule. Secondary deposits occur by extension along the renal veins into the inferior vena cava resembling thereby a sarcoma. Blood borne emboli give rise to deposits in the skull, and long bones, and the vertebræ.

CARCINOMA.—Undoubted carcinoma is a rare tumour and is usually an adeno, or papillary carcinoma.

PAPILLOMA.—Is the commonest tumour of the renal pelvis and the upper part of the ureter. It has a great tendency to recur and to become malignant. Surface implanation of these growths may occur in the ureteral opening or the bladder.

SYMPTOMS AND SIGNS.—Spontaneous hæmaturia unaffected by rest, pain, gradual loss of weight and strength. Sudden development of a varicocele in an adult especially on the right side is always suspicious of malignant disease of the kidney. A palpable tumour may be present, but a carcinoma may give rise to no enlargement of the kidney.

CYSTOSCOPIC EXAMINATION.—Blood may be seen issuing from the ureter or worm-like clots may be seen hanging from the ureteral opening. Specimens of urine taken by ureteral catheter from both kidneys may show a diminished function of the affected side, also whether the opposite kidney is functionally good. A cytological and bacteriological examination of the specimens may help in the diagnosis.

PYELOGRAPHY.—May show deformity of calyces or renal pelvis.

1. A partial or complete obliteration of one or more calyces.

2. A spider-leg distortion of the calyces.

3. A distorted renal pelvis from growth protuding into it, or a complete obliteration of the pelvis as sometimes seen in a large papilloma of the pelvis.

A good Radiogram may also show the shadow of an enlarged kidney.

TREATMENT.—Complete nephrectomy with the perirenal fat is to be done, provided the other kidney is proved to be functionally good. Palliative treatment in non-operable cases morphia, aspirin, bromides for the pain, calcium and ergot for hæmaturia.

POLY-CYSTIC KIDNEY.—Hæmaturia is intermittent and usually small in quantity. The condition is by-lateral. One kidney may become palpable sometime before the other. Pain is usually absent. A high grade of renal inefficiency is also present. The condition becomes apparent at the age of about 40 or after though the disease is a congenital one. No treatment is possible. Uræmia is the ultimate result ending in death.

RENAL TUBERCULOSIS.—More common in young adults of either sex with a slightly higher incidence in women. Increased frequency of micturition both by day and night is characteristic. Hæmaturia is slight and intermittent, occasionally severe in advanced cases of ulcerating type. Urine is passed every half hour with pain before and micturition, not relieved by rest. There is low fever, and gradual loss of weight. The urine is either faintly acid or neutral in reaction with a few erythrocytes and pus cells. Tubercle bacilli may be found. If on culture it appears sterile, a guinea pig inoculation test should be done.

CYSTOSCOPY.—Retraction of the ureteral opening “the golf hole ureter” a symmetrical position of ureteral openings may be noticed, a pulling upwards and outwards of the ureteral opening of the affected side due to an involvement of the ureter in the tubercular process. Tiny greyish or yellow tubercles may be noticed around a congested ureteral opening. Catheter specimens of urine from the ureters should be taken for cytological and bacteriological examination and chromocystoscopy and other functional tests should be carried out at the same time.

PYLOGRAPHY.—In the early stages a widening of calyces with a fluffy outline and a widening of the upper ureteric opening, later the renal pelvis will also show dilatation (Braasch). Later still in an advanced condition, the pelvis is a large sac, the calyces distended and ragged cavities found in the cortex. An irregular thickening and dilatation of the ureter may also be seen. As far as possible a pyelogram should be avoided in these cases for fear of dissemination of the disease, and diagnosis arrived at by other means.

TREATMENT.—If the disease is unilateral—in 80% of the cases it is so—and the other kidney is proved to be efficient to carry on the work and no other contra-indication is present, nephrectomy is to be performed, and general and hygienic treatment carried out at the same time. In neglected cases the bladder becomes infected and the patient's life becomes a misery from the increased frequency of micturition which almost becomes a continuous desire for passing urine without any satisfaction.

RENAL CALCULI.—Blood in these cases is very small in quantity and detected only by the microscope,

but it may be profuse after an attack of renal colic. Hæmaturia is increased by jolting, walking, or renal palpation and is relieved by rest. A stone in a calyx may remain latent. Renal colic with its radiating pains is fairly characteristic, and caused by passage of clot, stone, gravel, or pieces of tumour. Radiographic examination will show the site of the stone. Small ureteric stones may give no shadows; oxalate and calcium stones give dense shadows. A pyelogram may show uric and urate stones as negative shadows. Both antero-posterior and lateral views should be taken. Functional tests of both the kidneys should be done.

TREATMENT.—Will vary with the size and situation of the stone, also by the fact whether the kidney pedicle is long enough for it to be out of the wound. Pyelolithotomy is the operation of choice for large stones in the renal-pelvis. A small stone passing down the ureter is best treated expectantly by giving anti-spasmodics and diluents. Calculi in the calyces not accessible by pyelotomy may have to be removed by Nephrolithotomy. In cases of calculous-nephrosis the kidney is so bad and functionally so useless, that if the other kidney is healthy, nephrectomy of the useless kidney is indicated.

RUPTURED KIDNEY.—Hæmaturia is absent if the tear is confined to the cortex without extending into the pelvis, when the ureter is torn across, or blocked by clot. It may occur without any external sign of injury as from acute flexion of the body. Shock and collapse usually accompany the injury. In children under ten owing to the absence of peri-renal fat the tear may extend into the peritoneum, and intra-peritoneal bleeding may occur. If the renal-pelvis is also torn at the same time, urine will mix with blood and set up peritonitis. In adults bleeding

is extra-peritoneal and into the peri-renal fat, and an area of dullness gradually increasing in size is demonstrable. If both kidneys are damaged anuria may occur.

DIAGNOSIS.—History of injury, the sudden onset of hæmaturia with shock and collapse and an increasing area of dullness in the flanks is characteristic.

TREATMENT.—When the injury is slight, rest in bed with flanks supported by a bandage and an ice bag will clear up the urine in a few days. If more severe hæmoplastine, calcium lactate, morphia, fluid diet with rest in bed will clear it up. Later a little urotropine is indicated. If a swelling is noticed in the flanks with no improvement in the symptoms or injury is severe the kidney is exposed by a lumbar incision, tears in the kidney sutured and the part drained. But if the kidney is damaged beyond repair and the other kidney is efficient nephrectomy is indicated. In these cases the bladder may be full with blood clot, which should be evacuated by Bigelow's evacuator or by supra-public cystotomy.

RUPTURED URETER.—The ruptured ends should be sutured and extravasated urine drained.

Presence of free fluid in the peritoneal cavity is an indication for an exploratory laparotomy with evacuation of blood and fluid, suture of the tear and drainage.

OTHER CAUSES OF HÆMATURIA.—Renal hæmaturia may occur by rapid emptying of a chronically once distended bladder, especially in prostatic cases. Slight hæmaturia may occur from intermittent kinking of renal vessels in a floating kidney. It may also occur in Hydronephrosis, Pyonephrosis, occasionally with Oxaluria. In Pyelonephritis it may be one of the earliest symptoms. It sometimes occurs in solitary abscess of bacterial embolism in an otherwise healthy kidney. It

may also occur in interstitial nephritis with high blood pressure, and in cardiac failure from a passively congested kidney. It also occurs in lukæmia.

ESSENTIAL HÆMATURIA.—It occurs suddenly without any sign of injury or infection, without pain except that caused by passage of clots. It stops as suddenly. Usually there is large quantity of blood mixed uniformly with urine, clots are rare. Radiography is negative. Between the attacks urine is clear and normal. Functional test show the kidneys to be normal. No apparent cause can be found. The possible causes of this condition are :—

1. Hæmophilia.
2. Purpura Hæmorrhagica.
3. Aneurysm of one of the branches of the Renal artery, which has leaked into the renal pelvis.
4. Infarcts of the kidney resulting from endocarditis.
5. Angiomatous condition of the renal pelvis, analogous to varicocele, varicose veins, etc.
6. A high blood pressure with a partial chronic nephritis limited to one kidney and due to some old organismal infection.

TREATMENT.—Rest in bed, hæmoplastin, calcium lactate, and morphia can be tried. Failing this exploration is indicated if the hæmaturia is severe. Removal of a papilla the seat of varix may be done. Hæmophilia should be first excluded. In cases of aneurysm, if small and limited to the kidney nephrectomy may be possible. As infarcts may become bilateral palliative treatment only is to be done.

THE PHARMACOLOGY OF THE ORGANIC COMPOUNDS OF ARSENIC.

BY CAPTAIN J. C. DAVID, M. B. B. S.,

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Modern medical practice is intimately bound up with the use of organic compounds of Arsenic. The number of these compounds that are being manufactured and let loose on a believing world is legion ! Some of them have stood the test of pharmacological and clinical methods and have established themselves as recognised therapeutic agents in the treatment of protazoan diseases. But the knowledge that an ordinary medical practitioner has of the pharmacology of these, in many cases potent, drugs, is unfortunately negligible. The ordinary text books on materia medica and pharmacology, if they mention these at all, have them in small print—which is suggestive of their unimportance from the examination point of view ; and even professors seem to share this view. The British Pharmacopœia, the revision of which is long overdue does not yet recognise even the most important of these compounds, so that these are still classed among the non-official drugs. It is clearly obvious that it is nothing short of quackery to prescribe and administer drugs the action of which we cannot explain, and the toxic effects of which we are ignorant of. It is therefore intended in the following few pages to give a general account of the pharmacology of some of the Organic derivatives of Arsenic with a view to a better appreciation of their therapeutic and toxic effects.

The introduction of the organic arsenic compounds that are used in the treatment of syphilis to-day was the

result of a prolonged research by Ehrlich and his co-workers. This research was conducted with the definite purpose of discovering a compound which would have a maximal destructive action upon the parasites, and a minimal toxic action upon the host.

Previous workers found that trypanosomes were killed by a number of organic arsenic compounds, the chief being *Atoxyl* or *Sodium Arsanilate*. But a large number of injections had to be given and the animal acquired tolerance to this drug. So Ehrlich hoped to find a substance that would completely sterilise the body in one dose. With this view he examined a long series of organic arsenicals and determined the minimal quantity that was required to kill trypanosomes in an infect animal (curative dose) and the maximal quantity that could be given without killing the animal (tolerated dose). The ratio of the tolerated dose to the curative dose is termed the curative ratio and he considered that no drug could be safely used unless the ratio was at least three, and he made a systematic search for a drug with as high a ratio as possible.

One of the first compounds to be investigated was *Atoxyl*, which contains pentavalent arsenic ; and it was found that although *atoxyl* would cure animals of trypanosomiasis, yet it had no action on the trypanosomes in vitro. The general rule was discovered that only trivalent arsenic compounds could kill trypanosomes and that the action produced in vivo by the pentavalent compounds was due to their being reduced in the body of the animal to the trivalent condition.

Ehrlich found that the most efficient substances were compounds of trivalent arsenic united to a benzene ring, with an amido group on the para position. He examined

the action of para-amino-phenyl-arsenious acid and a number of substitution products ; but the results varied greatly. Dihydroxy diamino arsenobenzene was then produced and was found to have a more favourable ratio between the sterilising and the tolerated dose than any other substance previously investigated. This substance is amphoteric for its amino groups, can unite with acids to form salts and the hydroxyl groups can unite with alkalis to form salts. The free base and the alkaline salts are readily oxidised in air, but the acid salts are stable, and the dihydrochloride acid salt was chosen as the most suitable form in which to issue this substance for therapeutic use. This combination was termed *Salvarsan*, and was numbered 606 in Ehrlich's series. *Arsenobenzol dihydrochloride* is freely soluble in water, but it forms an acid solution which is very toxic and also is irritant and therefore cannot be injected intravenously. The addition of two gram-molecules of sodium hydrate to one gram-molecule of salvarsan sets free the neutral base ; this is insoluble in water and forms a turbid suspension. This suspension can be injected intramuscularly but cannot be used intravenously. The addition of a further two gram-molecules of sodium hydrate produces the alkaline salt of salvarsan which is freely soluble and is the form in which salvarsan is administered. The solution of the alkaline salt of salvarsan is strongly alkaline and cannot be given intramuscularly, but it can be injected intravenously provided that it is diluted with a large volume of water or saline. A dose of 0.6 gram is given diluted in about 200 C. C. of water. As the technique of injecting salvarsan was laborious, Ehrlich prepared *neo-salvarsan*, which is a condensation product of salvarsan and sodium formaldehyde sulphonylate. This is a stable preparation and dissolves in water in

neutral solution and can therefore be injected intravenously in concentrated solution.

The discovery of salvarsan was a great advance in the treatment of syphilis and a number of other organic preparations of arsenic have been manufactured. It is a remarkable tribute to the genius of Ehrlich, with whom was associated the Japanese Hata, that no compound has been found which has any marked superiority over salvarsan and neo-salvarsan.

Other drugs which have proved of use in protazoal diseases are :—

A. Pentavalent Compounds of Arsenic :

1. Sodium Arsenilate, Atoxyl or Soamin.
2. Tryparsamide 3. Cacodylates and 4. Stovarsol.

These compounds have been used in the treatment of trypanosomiasis and have proved very effective, but unfortunately atoxyl occasionally produces atrophy of the optic nerve and blindness.

Tryparsamide is Sodium salt of N-phenyl—glycine amid p-arsenic acid. Exceptional power of tissue penetration is claimed for it and it is stated to be of value in the treatment of cerebral syphilis. It is a white amorphous powder containing only a small percentage of arsenic, about 25%. It can be given intravenously or intramuscularly. For intravenous injection it can be conveniently dissolved in 10 to 20 C. C. of cold sterile doubly distilled water. The average dose is 2 to 3 grams. Tryparsamide does not act clinically as a spirocheticide, for it has no effect against the primary or secondary lesion of syphilis nor against the gummata. It has apparently little effect in the early cerebro-spinal manifestations, but its value

seems to be confined to disseminated sclerosis before this has resulted in irreparable degeneration of the nerve cells. The effect has been attributed to the provocation of local inflammatory reactions, that would resolve the sclerotic lesions. But the great danger in the use of tryparsamide is the risk of blindness; and this has to be weighed carefully. Therefore this drug would generally be restricted to cases of the type in which it has been most successful and which have failed to respond to other treatment. In 1 to 5 per cent. of cases the impairment of vision is serious. The occurrence and outcome are at present largely unpredictable and unavoidable. They more often follow the first injection and do not seem to occur after the fourth injection. Its parasitocidal action is more marked for trypanosomes than for spirochetes. Tryparsamide has been extensively tried in the treatment of piroplasmosis in dogs belonging to the Madras Hunt by Symmons and Theodore with unsatisfactory results and they had to resort to salvarsan to effect amelioration of symptoms.

Cacodylates: The effects of cacodylic acid (dimethyl arsenic acid) are essentially those of inorganic arsenic, to which it is partly reduced in the body. Since this reduction occurs but slowly the action is more prolonged but is less toxic and the local irritant effects are avoided. The degree of reduction is variable; and the cacodylate especially when given by the mouth, imparts a garlic odour to the breath, sweat, urine, etc. To avoid the more rapid reduction in the stomach, intestines and liver, it is usually administered hypodermically or intramuscularly. Excessive doses produce toxic symptoms, due mainly to the ionic arsenic although the cacodyl molecule may conceivably play a part. Therapeutically it is used in the same conditions as inorganic arsenic.

In syphilis its efficiency has been questioned. It is said to give rise to fibrosis of the vein. Severe nephritis sometimes follows its use. Its chief use is in the anæmias. Cacodylates are derivatives of the aliphatic series.

Stovarsol: Acetyl-amino phenyl-arsenic acid has been exploited as a prophylactic against syphilis. It is supplied in tablets of 0.25 gm. In addition it is said to exert a rapid action on the surface lesion of primary syphilis. It is difficult to prove by conclusive evidence that it is a sure prophylactic. This fact, combined with the danger of its being ineffectual and of simply masking symptoms, and the danger of after-effects, if the drug is broadcasted to the general public as a preventive, should make it essential that every practitioner before using it keep the drug under his personal supervision and control, until a knowledge of its action and efficiency is much more definite than it is at present. A note of warning about the indiscriminate sale and use of this drug has rightly been sounded by the members of the British delegation on the prevention of venereal disease in their report to the Government of India. *Stovarsol* has also been introduced for the treatment of amoebic dysentery, both in the active and the encysted stages.

B. Trivalent Arsenical compounds :

1. *Salvarsan* or arsphenamine or arsenobenzol.
2. *Stabilarsan* or arsphenamine diglucide. This is a compound of one molecule of salvarsan and two molecules of glucose and it is freely soluble in water in neutral solution and the solution when exposed to the air is relatively stable. It is supplied in ampoules, a 10% solution of the drug in a 50% solution of glucose. It can be injected intramuscularly or intravenously without dilution.

3. *Neo-salvarsan* or neoarsphenamine or neoarsenobenzol.

4. *Silver salvarsan* or silver arsphenamine. This compound is a combination of silver and arsenobenzol containing 20% arsenic and 15% silver. It has a stronger therapeutic action and also a stronger toxic action than arsenobenzol.

5. *Sulpharsanol*, sulpharsphenamine is a condensation product of salvarsan with two molecules of Sodium formaldehyde bisulphite and resembles neo-salvarsan in its actions, but its therapeutic activity is not so great. It has the advantage of being less irritant and can be administered subcutaneously.

The mode of action of organic arsenicals : Ehrlich, when he introduced salvarsan, put forward the theory that the drug had a simple paracitidal action. His view was that certain side chains in the drug had a selective chemical affinity for certain side chains in the protoplasm of the spirochete, and therefore the drug killed spirochetes at a concentration which did not injure the tissues of the host. The superiority of salvarsan over the hundreds of other organic arsenicals tested was believed to be due to its possessing this selective chemical affinity. Recent researches have shown that the mode of action of the organic arsenicals is more complex than is suggested by the above theory, for although salvarsan has a trypanocidal action in vitro yet this action is too feeble to account for its powerful action in vivo. In other words it would seem that the trypanocidal and spirocheticidal activity of the organic arsenical preparation in vivo is not a direct and simple chemical action of these substances upon the parasites but that a change occurs in the blood and other tissues. This change may be (a) the formation of new combination compounds, presumably with

proteins, (b) a simple chemical change of oxidation or reduction without the formation of a combination product ; (c) a production of antibodies, or (d) a combination of one or more of these factors.

It was imagined that the liver substances formed trypanocidal combinations in the body. Solutions of salvarsan in liver emulsions and in saline after being incubated at 37° C for an hour or so were slightly more toxic and more trypanocidal than freshly prepared solutions. The saline solution was not less trypanocidal after incubation than the liver emulsion solution. Solutions of salvarsan exposed to the air acquire increased trypanocidal activity presumably by the formation of 'oxides'. In other words a chemical change had occurred tending to increase trypanocidal activity, but this is not appreciably influenced by the menstrum. It is possible that enzymes from the liver may hasten the process, but there is no evidence of the formation of therapeutically active combinations of the arsphenamine and cellular substances.

It has been clearly established that trivalent compounds of arsenic are more toxic and likewise more trypanocidal than the pentavalent compounds. The time required for the appearance of toxic symptoms or evidences of trypanocidal activity is generally longer for pentavalent than for trivalent arsenical compounds. It has also been shown that the arsenic is reduced in the body ; and so it is reasonable to assume that the longer latent period required by the pentavalent compounds is for the reduction of a sufficient amount of the drug to the trivalent form. It is also known that compounds containing arsenic in the 'oxide' form, like arsenious acid, exert toxic and trypanocidal effects much more rapidly than arsenobenzol compounds, in which the arsenic is

directly combined with the C. The immediate onset of the reaction and the great regularity with which it preceeds shows that the compounds of the 'arsenoxide' type are directly trypanocidal. But arsenobenzol derivatives and the pentavalent arsenicals do not produce such immediate effects, as these are not directly trypanocidal but must first be converted into the active 'oxides'. Of course in the preparation of the solutions sufficient 'oxides' may be produced or be present in the powder to exert some immediate effects, but the latent period required before the main trypanocidal effects are apparent, naturally leads to the conclusion that some change is required in the body; and it is natural to surmise that the 'oxides' are important, as the first logical step in oxidation would be the breaking up of the arseno-grouping to the oxide grouping. The greater trypanocidal activity shown by the solutions after being left standing for some time and their increased toxicity under the same conditions is also attributed to the formation of oxidation products. This also explains why arsenobenzol has little action on trypanosomes *in vitro*. In the case of pentavalent arsenic compounds, they are reduced in the body and this reduction leads to the same As : O grouping as is formed on oxidation of the arsenobenzol grouping. Since however, reduction is less easily accomplished than oxidation it is to be expected that the latent period would be longer in these cases.

The question also arises whether curative activity is aided by the production of antibodies. Experiments show that salvarsan has no appreciable effect upon increasing specific antibodies in rabbits immunised with dead trypanosomes.

The organic arsenicals, therefore, form a very striking example of compounds which are introduced into the body in an inert form and which owe their therapeutic activity to changes which they undergo in the body.

Fate in the body. Pentavalent arsenic compounds, such as atoxyl are excreted with remarkable rapidity. Commencing within four hours, about 85% is excreted in 24 hours, in the urine. As Atoxyl is reduced in the body slowly it is not fixed and hence the rapid excretion. The trivalent forms are excreted more slowly. Salvarsan is insoluble in neutral watery solution and therefore cannot exist in true solution in the blood, but must form a colloidal suspension. Most of the drug appears to be broken down to some simpler forms in the course of a few hours. The maximal amount excreted in 24 hours is about 3%. Less than 2 mg. of arsenic is excreted in the urine. Neosalvarsan disappears from the blood slightly more rapidly. The arsenic retained in the body is stored chiefly in the liver.

Toxic effects : are very varied but can be divided into three main groups :

1. Immediate vasomotor reactions appearing within a few hours of injections.
2. Effects due to acute arsenic poisoning appearing in a few hours.
3. Effects due to delayed arsenic poisoning appearing after several weeks.

The vasomotor reactions occur most frequently after the first dose of salvarsan. The chief symptoms are chill and rigors, followed by pyrexia and headache, together with a fall of blood pressure. Oedema and urticaria are also noticed. These are alarming but not fatal. These may be due to salvarsan producing some alteration in the blood proteins. They can be inhibited by injection of adrenalin.

The effects due to acute arsenical poisoning which occur after a few days are much more serious than the vasomotor reactions, and are the most frequent cause of death. They occur most frequently after the third or fourth injection. They may manifest themselves by skin eruptions which may occur up to the eleventh day, in

some cases passing on to exfoliative dermatitis ; nervous symptoms, usually appearing after three to five days with convulsions passing on to coma and death ; and jaundice. The nervous symptoms seem to be due to the drug injuring the cerebral arterioles, for encephalitis hæmorrhagica is found post mortem. The symptoms of delayed arsenic poisoning only appear several weeks after the last dose of the drug has been given and the chief symptom is jaundice, which may be followed by death.

The chief precautions which may be taken to reduce the incidence of toxic effects are as follows : (1) the use of reliable preparations of the drugs. The drug is packed in tubes filled with nitrogen and if the tubes leak, products of oxidation may be formed ; (2) the maintenance for an exactly constant technique in the preparation and administration of the drug ; (3) the thorough preliminary examination of patients for possible visceral disease ; (4) the careful observation of patients while they are receiving the series of injections.

Exfoliative dermatitis is successfully treated by injections as well as oral administration of Sodium thiosulphate or Hypo.

The value of treatment is tested by the wasserman reaction. Continuous injections have to be given to prevent the multiplication of surviving spirochetes. Salvarsan has also been used in the treatment of several trypanosomal infections. It cures 90% of cases of relapsing fever and 99% of cases of Yaws. It kills the trypal nasomes in blood in sleeping sickness but is no use in later stages.

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THE EFFECT OF THE SEASONS ON THE BODY WEIGHT IN PULMONARY TUBERCULOSIS UNDER HOSPITAL CONDITIONS IN SOUTH INDIA

BY RAO BAHADUR M. KESAVA PAI, M.D.,

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AND

C. A. VENUGOPAL, L. M. & S.

In all tuberculous conditions, including tuberculosis of the lung, increase in weight has been generally accepted to be one of the main points in judging the progress of a case towards improvement and recovery. Whilst it has been recognized that in the obese form of tuberculosis no great importance can be attached to increase in weight, in the vast majority of cases such an increase is a definitely favourable sign just as decrease in weight is a sign of a run down in the general condition. Several conditions have been known to cause a temporary fall in weight in tuberculosis in spite of a general clinical improvement ; for instance in the treatment of pulmonary tuberculosis by artificial pneumothorax, in the chemotherapy of tuberculosis by gold salts, in the treatment of tuberculous conditions by tubercle vaccines and in the physical treatment of convalescing cases by graduated exercises, an initial fall of weight is not uncommon in spite of an amelioration of the local condition and improvement in the general health. Such a temporary fall in the weight is, as a rule, followed by a subsequent increase, as long as the favourable progress is maintained.

It has been the general clinical opinion on the continent that rest in bed is very important not only in the acute stages of pulmonary tuberculosis, but in the fibrosing convalescent stage as well till the temperature drops quite to the normal, though the increase in weight by such a procedure may be due to the deposition of fat in the subcutaneous tissues and elsewhere. In England on the other hand, Marcus Paterson and others have insisted on the importance of graduated exercises much earlier in convalescence. Fibrosis is, in fact considered to be hastened by such exercises rather than by rest, for whilst absolute rest in bed has a tendency to fat deposition, graduated exercises by directly influencing metabolism and by auto-inoculation lead to an ultimate steady improvement in the affected tissues and an increase in weight by development of muscular and other tissues rather than by fat accumulation, after a temporary decrease in weight due to the burning up of the fat accumulated during the period of rest.

In Judging the effect of the seasons on weight amongst the generality of tuberculous patients under treatment in hospitals, it is therefore important to eliminate the factors that might temporarily upset the weight curve on account of certain patients losing weight for the time being under the clinical conditions described above. It is also important that the weights of patients in the very advanced stages who go rapidly downhill in spite of any treatment should be excluded from the calculations, as such patients unfortunately form a considerable proportion of those seeking admission into the hospitals of this country. In the investigations forming the subject of this paper we have therefore excluded such cases and in order to eliminate the temporary factors concerned in pneumothorax treatment, chemo-therapy

etc., we have taken the average weights by months, instead of by weeks, in preparing the weight curves. This minimizes the experimental error, though it cannot exclude it entirely. Thus for instance a large number of cases commencing either chemo-therapy or pneumothorax treatment in a particular month will vitiate the figures for that month, either by exaggerating the drop in the weight curve or by minimizing the rise therein. A preponderance of patients in the final stage of convalescence where weight ceases to increase or in the acute stage before the commencement of improvement when the weight will probably be on the falling side, will similarly affect the correctness of the figures, as also acute intercurrent conditions like epidemics of influenza, enteritis and dysentery to which hospital patients, like the general population, may sometime be subject.

Lunde¹ considers that increase of weight in tuberculosis is due mainly (1) to deposition of fat resulting from good feeding and assimilation and (2) to retention of water in the system depending on the temperature and humidity of the atmosphere. He argues that in the hottest part of summer there is increased evaporation from the body with decrease of water retention, with at the same time decreased assimilation due to the heat, both factors leading to loss of weight. During spring and early summer, on the other hand, there is both decrease of loss of heat from the body with the resulting maximum fat deposition and increased assimilation of food, leading to gain in weight. In winter again there is the decreased assimilation due to the severe cold with increased loss of heat by radiation from the body and the consequent increased oxidation of fat and lessened fat deposition, along with increased kidney function and discharge of water from the system, all these factors leading to loss

of weight. Lunde by his observations in Norway has produced weight curves which show a slight rise in spring and a higher rise in late summer and autumn, periods of the year when the temperature is neither very high nor very low, and the humidity of the air favourable for water retention, especially in the autumn.

Frimodt Moller's² observations at the Arogyavaram Sanatorium in South India show similarly interesting curves for the weight, but on account of climatic conditions being quite different from those in which Lunde worked in Norway, he found that at Arogyavaram patients showed a slight gain in weight in the later summer months, when the monsoon winds cooled down the atmosphere and increased its humidity and a marked gain in weight in the cooler months of October to January, with a fall in weight in the dry and hot months of February to May. The daily mean temperature at Arogyavaram is 78° to 81° F in the late summer, June to October, and 80° to 85° F in the hotter months, February to June. The hot months are dry and the cooler months comparatively humid, so that Frimodt Moller's observations confirm those of Lunde that a high temperature and a dry atmosphere decrease weight, whilst a lower temperature with humidity tend to increase the weight. Winter conditions do not exist in Arogyavaram and the winter dip of the weight curve is naturally absent.

The climate of Madras is again different from that of the two localities referred to in the abovementioned observations. Madras has a strictly tropical climate and being on the coast the air is humid during the greater part of the year, being less so in the summer months and more so in the cooler months, October to March, which coincides with the wet season due to the North East monsoon. The mean temperature of the air from March

Mean Temperature, Rainfall and humidity in Madras.
(1923 to 1927.)

Month.	1923			1924			1925			1926			1927		
	Tempa- rature.	Rainfall.	Humi- dity.	Tempa- rature.	Rainfall.	Humi- dity.	Tempa- rature.	Rainfall.	Humi- dity.	Tempa- rature.	Rainfall.	Humi- dity.	Tempa- rature.	Rainfall.	Humi- dity.
January	75.2	4.46	70	75.9	2.37	77	74.4	1.33	77	76.7	1.11	79	77.0	0.55	77
February	77.7	...	75	77.5	...	72	76.8	...	71	77.6	...	73	79.0	...	74
March	81.0	0.64	74	80.8	0.13	71	79.6	2.86	76	82.4	...	74	82.4	...	72
April	84.8	...	74	85.6	...	73	84.0	0.05	77	85.7	0.10	72	85.4	...	72
May	87.1	0.03	65	88.0	...	66	85.8	4.04	70	88.3	0.10	67	88.5	0.37	65
June	88.9	1.96	58	88.1	3.45	58	87.3	0.24	60	89.8	0.40	58	88.0	3.80	60
July	86.6	1.65	59	84.3	5.63	72	85.2	3.81	65	85.1	2.77	68	...	...	...
August	85.3	3.30	62	85.0	2.57	71	83.4	5.99	73	84.8	4.57	69	...	...	...
September	83.4	3.31	71	82.1	9.67	80	84.3	1.35	72	83.8	1.71	75	...	...	...
October	80.8	15.89	80	81.8	4.94	77	80.4	16.72	80	81.5	7.36	78	...	...	...
November	78.5	3.63	77	77.2	16.01	82	77.7	16.97	83	77.2	12.21	82	...	...	...
December	76.5	2.56	78	75.0	0.85	76	75.2	13.48	84	75.9	1.09	76	...	...	...
Annual	82.2	37.33	71	81.8	45.62	73	81.2	66.84	74	82.4	31.42	73	...	...	...

to October varies from 80° to 90° F, maximum temperatures of 105° to 110° F, being often experienced on some days in May and June. The mean daily temperatures from October to March vary from 74° to 80° F (*Vide* Table).

The variations between the maximum and minimum of the day at any part of the year are comparatively slight due to the situation on the coast. The rainfall which depends on the North East winds is about 30 inches on the average per year and occurs mostly during the months of August to January coinciding with the cooler months of the year. It is evident from the temperature records that the climate of Madras is hot all the year round with the exception of the 3 months November to January when it is comparatively cooler, the temperature remaining below 80° F all the day. It is apparent therefore that though these three months must have a favourable effect on the progress and weight of tuberculous patients, the differences in this respect between these three months and the rest of the year cannot be so marked as in Norway or at Arogyavaram. The weight curves fully bear out this view, for whilst the general increase during the months of October to January is uniform all the five years of these observations, the variations during the remaining months have been neither uniform nor steady. There has however been a distinct dip in the curve during the hottest months of the year, *i.e.*, April to July.

The different curves in the accompanying chart are sufficiently explanatory by themselves. It is observed that the temperature and humidity curves vary inversely which is natural in the case of a coast station like Madras. The weight curve as will be observed in the chart is represented in percentages of increase every month over

the preceding month. In calculating the weight figures we have eliminated the weights of cases which were admitted into the hospital in a highly advanced condition and did not consequently show any improvement by any treatment, as also the weights of the ordinary cases during attacks of acute intercurrent diseases when the sudden fall lasting 2 or 3 weeks or more was apt to vitiate the normal variations. The weight figures have been obtained from 567 cases in the 5 years 1923—1927. It is very interesting to note the consistent general agreement between the 3 curves for temperature, humidity and weight during the 5 years, the former varying inversely as the two latter which run almost parallel to each other.

It is thus clear that the observations in the tropical coast climate of Madras City fully bear out the observations made in a hill climate like that of Arogyavaram and a colder climate like that of Norway, the differences observed being due to the differences in the climate of the three places. Thus whilst Madras has practically two main seasons for the year, *viz.*, the hot and comparatively dry months April to September and the cooler and more humid months October to March, there are only two variations in the weight curve corresponding to these two parts of the year, *viz.*, a rise during the cooler months and a fall during the hotter dry months. At Arogyavaram on the other hand there are more or less three different seasons for the year, *viz.*, the hot and dry months of March to May, the cooler and less dry months of June to August and the coolest and comparatively humid months September to February, causing a dip in March to May, a smaller rise in June to August and a larger rise during the rest of the year. In the cold climate of Norway there are four variations of the weight curve during the year corresponding to the four seasons, *viz.*, a fall during the

warmest months of summer, a rise during late summer and autumn, a fall during winter and a rise again in spring and early summer.

Observations made by different persons in different climates thus give identical results regarding the effect of the seasons on the body weight. Extremes of heat and cold and dryness of the air cause a loss of weight, whilst a pleasant temperature corresponding to the summer in colder countries and the cold seasons in the tropics with relative humidity of the air produce a gain in the body weight.

The rainfall, as is evident from the charts, has apparently no effect on the body weight.

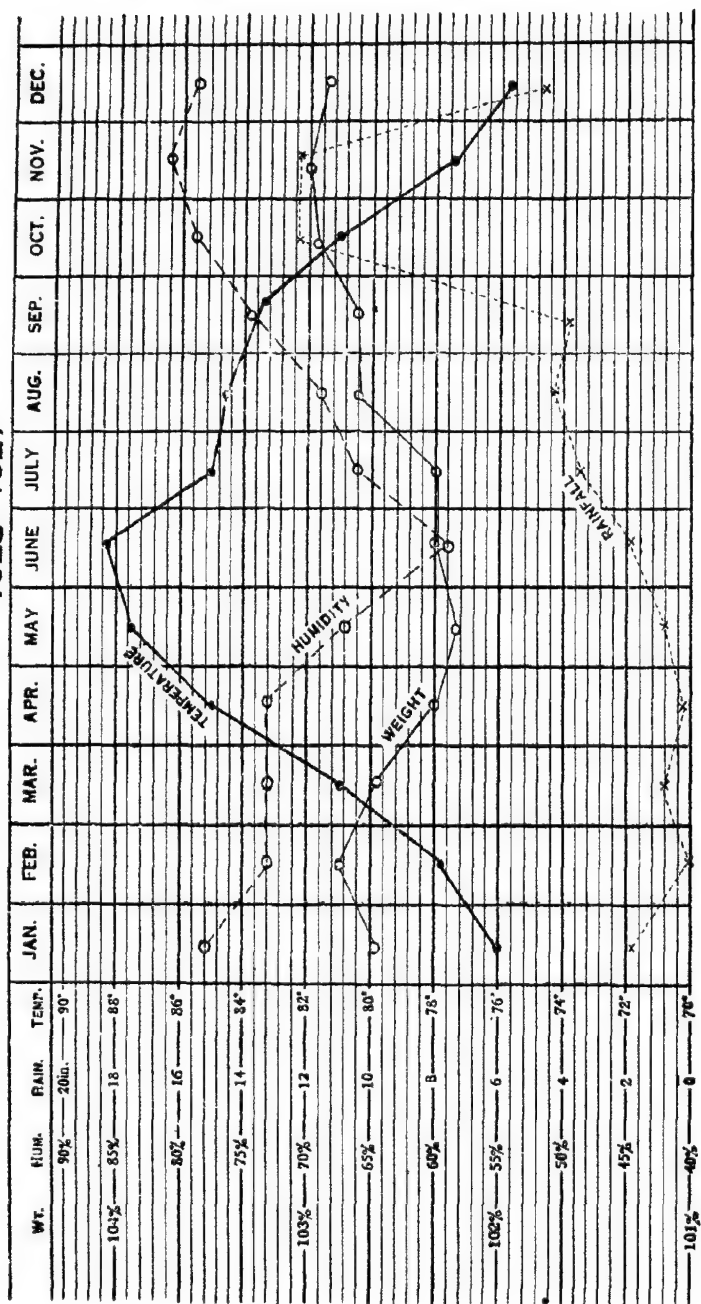
Clinical observations in cases of pulmonary tuberculosis have thus borne out the correctness of the view that the increase of body weight and general improvement of the patients, which are coincident conditions, take place in different countries during those parts of the year when the temperature and humidity are consistent with personal comfort and conducive to assimilation and optimum metabolic conditions.

We are grateful to the Government Meteorologist of Madras for supplying us with figures for temperature, rainfall and humidity for the period covering the above observations.

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 2. *Frimodt Moller, C.*—Climate and Weight of Tuberculous patients in South India—*Tubercle*, 1921—p. 385.
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1923-1927



EXTRACTS FROM JOURNALS.
ON THE TUBERCULOUS NATURE OF
PLEURISY

By H. B. ANDERSON,

American Review of Tuberculosis,

February 1928—page 147.

The author considers that pleurisy is very rarely a primary disease. The evidence adduced at autopsies proves that pleural inflammation is almost invariably secondary to the tuberculous infection of the lung. Pleurisy with effusion is almost invariably tuberculous, but dry pleurisy though usually tuberculous may include cases secondary to focal infections, Rheumatism, Septicæmia, Emboli, Bronchitis, Bronchiectasis, Injury, etc. Pleurisy is a mild phase of tuberculosis and mostly ends in recovery. The prognosis and prospects of life in healed tuberculosis in a person of over 30 years of age are favourable. It is the usual experience that persons who have recovered from pleurisy in childhood and early adult age are more immune to tuberculosis than the ordinary individual, unless the person is underweight and there is a bad family history and poor chest formation. In giving a prognosis, occupation, habits and environment are important considerations.

M. K. P.

A NOTE ON USE OF BENZYL CINNAMIC ESTER IN TUBERCULOSIS

By H. GAINSBOROUGH, M. B. (Cantab.), M. R. C. S. (Lond.).

Lancet 5th May 1928—page 908.

The methods of treatment of tuberculosis by injection of Benzyl Cinnamic Ester first advocated by Jacobson has given good results in the hands of various French Workers. Cases of Tuberculosis of the skin, of glands, larynx and lungs are all benefited by the treatment. This consists of the intramuscular injections of the ester given in courses of 12 daily injections, the dose varying from 0.25 to 1 c.c. according to the nature of the case. The occurrence of severe reactions especially in pulmonary tuberculosis is an indication for the smaller dosage whilst lupus and the other chronic types like adenitis, Scrofula can be treated with the larger doses. A rest of fifteen days is to be given after each course and 3 or more series of injections will have to be given in different cases. The author gives an account of three typical cases treated by him, one of tuberculous cervical glands which markedly improved, one of tuberculous kidneys and cystitis which showed decided benefit; and the third of pulmonary tuberculosis complicated with laryngitis. This last case showed considerable improvement both of the pulmonary and of the laryngeal condition. Many other cases have also been treated with marked benefit. There have been no severe reactions and the results obtained so far are encouraging.

M. K. P.

FURTHER RESULTS WITH SANOCRY SIN IN
PULMONARY TUBERCULOSIS

BY FREDERIC HEAF, B.A., M.D.

Tubercle December, 1927—page 105.

The author gives an account of 50 cases treated with Sanocrysin. The cases were in different stages of the pulmonary disease. Of the 50 cases, 16 were clinically arrested, 12 improved without relapse, 5 relapsed after temporary benefit, 10 showed no improvement and 7 cases either got worse or died directly as a result of the treatment. It was found that a concomitant treatment with artificial pneumothorax gave better results than with bare Sanocrysin treatment. Slow and cautious dosage was essential to prevent reactions and complications. An initial dose of 10 cgr. and a terminal dose of 1 gramme for adult men and .75 gramme for adult women were found adequate. The intervals should be sufficiently long especially on the occurrence of reactions. In cases of albuminuria, metallic poisoning, diarrhœa, abdominal pains and loss of weight, the treatment should be discontinued. The author concludes that the results of Sanocrysin therapy are not sufficiently encouraging to try it by itself apart from the usual routine methods; that only a small percentage of cases are suitable for the treatment; that the drug cannot always be said to be a safe one; that the results are not certain; that better results are observed when collapse therapy is employed alongside of Sanocrysin treatments; that children take the treatment well; and that definite arrest of the disease as a direct result of the treatment is observed in a certain number of cases.

M. K. P.

THE VALUE OF BISMUTH THERAPY IN
SYPHILIS

BY C. LEVADITI AND FOURIER,

Lancet 7th April, 1928—p. 692.

The authors prove by experiments on rabbits that bismuth either alone or in combination with arsenic acts on the spirochætes of syphilis and on the lesions of syphilis. They consider that the insoluble salts of bismuth are much better tolerated than the soluble derivatives. The Spirochætes very often disappear after the first injection. They record cases of treatment by intramuscular injections of 2 to 10% solution of Bistovol (H. 13) and of the oral administration of Bismuth Stovarsol and conclude that this latter preparation whether in solution or in the solid state is well tolerated in doses of 2 gramme daily for 8 to 11 days corresponding to .82 gramme of Bismuth and .8 gramme arsenic daily, no digestive or other disturbances followed the oral administration. An erythematous rash occurred in two cases but subsided quickly. The Spirochætes disappear and the serum reaction becomes negative early and remained so for long. This method of treatment is, in the opinion of the writers, superior to that by administration of mercury. Both clinical and experimental evidence proves the superiority of bismuth Stovarsol over mercury, being much less toxic and attended with less of renal and mucous reactions and distinctly superior in its effects than mercurial preparations.

M. K. P.

THE SEDIMENTATION TEST—ITS TECHNIQUE
AND ITS VALUE IN DIFFERENT DISEASES,
WITH SPECIAL REFERENCE TO
TUBERCULOSIS IN INDIA.

By C. FRIMODT MOLLER, M. B., CH. B.

AND

P. V. BENJAMIN, M. B., B. S.

The authors give an account of their technique of the red corpuscles stability test in pulmonary tuberculosis as carried on at the Tuberculosis Sanatorium at Arogyavaram. By using Morriss's modification of Westergreen's method in 218 normal or non-tuberculous cases and 282 tuberculous patients in different stages of the disease, they conclude that the test is a delicate one in diagnosing pathological conditions; that it is not a special reaction but an indication of destruction of cell tissue and increase of the fibrinogen content of the blood; that the figures obtained in tropical climates are higher than those of colder countries; that normal figures for South India are 10 to 15 for men and 15 to 20 for women equivalent on the Westergreen scale to 17 to 25.5 m. m. for men and 25.5 to 34 m. m. for women that the value of the test is similar to that of fever in tuberculosis; that when duly considered along with other clinical conditions it gives valuable information regarding the activity of the tuberculous process; that its prognostic value is considerable as it often gives very early warning of the coming onset of complications, enabling the physician to take early steps in the way of prevention and treatment; and that in patients under collapse therapy it gives a more correct indication of its efficacy or otherwise than other clinical signs. They lay particular stress on details of technique as they find that the longer the period that is allowed

to elapse between the extraction of the blood and the commencement of the test and the higher the temperature of the room, the quicker the sedimentation takes place so that it is absolutely essential in comparing the results obtained by different workers to know what the air temperature was at the time of the experiment and how long the blood was allowed to remain in the storage tube before being put up for sedimentation.

M. K. P.

THE CO-ORDINATION OF MEASURES FOR THE CONTROL OF PULMONARY TUBERCULOSIS

BY HYSLOP THOMPSON, M. D., D. P. H.

Tubercle, January 1924.

Dr. Hyslop Thompson gives his experience of the efficacy of anti-tuberculosis measures as the Country Medical Officer of Health and Country Tuberculosis Officer of Hertfordshire. He lays great stress on the importance and necessity for better and earlier notification of cases, which means greater and more sustained co-operation of the medical practitioner with the tuberculosis officer; the importance of a routine examination of the sputa of patients with a view not only of diagnosing the disease but of supplying the health authorities with information regarding the location of the 'Open' cases and of tuberculosis nests; the desirability of having institutions for the treatment of early and of advanced cases of tuberculosis; the necessity for a better standard of dispensary treatment which depends on close co-operation between the dispensary officer and the local practitioner the importance of early diagnosis at the dispensary to enable Sanatorium treatment to be given at the right time

to enable the authorities to improve housing conditions and encourage health visiting with the object of instructing the public in domestic Hygiene and proper feeding; and the desirability of forming bodies like care-committees to guide the policy of the local body and do social and other work for the control and treatment of the disease.

M. K. P.

ON TWO APPARENT RECOVERIES FROM
ANÆSTHETIC LEPROSY FOLLOWING
PROTEIN SHOCK TREATMENT

BY DR. P. MANSON BAHR, D.S.O., M.D., (CAMB)

F.R.C.P., (LOND.)

Lancet, 2nd June 1928—p. 1111.

The writer narrates two cases of anæsthetic leprosy both patients from Asia, who were resident in England during 1925 and 1926, treated by ('Protein Shock'.) The first case who had typical anæsthetic patches on the forearm was treated with Hasson's vaccine consisting of 15,000 killed *B. Pyocyaneus* and 5,000 million leprosy bacilli per c. c. Six injections ranging from $\frac{1}{2}$ to 1 c. c. at one week's intervals were given. The patch disappeared, sensation returned and hair began to grow on the patch. The second was a case of anæsthetic leprosy on both arms. He was treated with intravenous injections of T. A. B. vaccine and showed a similarly remarkable improvement. Both were clinically typical cases of leprosy and bacilli were demonstrated in one of the two. Protein shock treatment is worth a trial in cases of leprosy.

M. K. P.

ASSOCIATION NOTES.

Minutes of a meeting of a General Body of the Association held on Tuesday, the 8th May 1928 at 4-30 p.m. at the Medical College, Madras.

CAPTIAN. J. C. David, M.B.B.S., read a short paper on the newly introduced subject of Pharmacology in the Medical curriculum of studies which was followed by some very interesting graphic demonstrations on living animals, comprising of the actions of various drugs on the heart, on the respiration, pulse, blood pressure, bladder, etc.

Rao Bahadur Dr. P. Krishnaswami in a short speech thanked the lecturer of the evening on behalf of those who were present for the very instructive demonstrations conducted by him.

Minutes of a meeting of the Executive Committee of the Association held on 21st June 1928 at the President's House.

PRESENT:—Dr. Kesava Pai, *President*; Dr A. Lakshmanaswami Mudaliar, *Vice-President*; Drs. G. Sreenivasamurthi, T. S. Tirumoorthi, P. V. Cherian, P. Venkatagiri and K. Koman Nair.

(1) Resolved that the officers of the Madras Medical Service do join the officers of the I.M.S., in giving a farewell dinner to the Surgeon-General, Major-General F.H.H., Hutchinson, I.M.S., who is proceeding on long leave.

(2) Resolved that the proposal to utilise the balance amounts from the previous and the coming annual services Dinners for obtaining an oil-painting of Major-General Hutchinson to be put up at the Medical College, be accepted.

(3) Read G. O. No. 488, Public, dated 26th May 1928, stating that Government Servants Associations must obtain permission of the Government before submitting Memoranda to the Indian Statutory Commission.

Resolved that the Association do not intend to submit any Memorandum to the Indian Statutory Commission.

THE MADRAS MEDICAL JOURNAL.

OCTOBER, 1928.

CRIME AND INSANITY*

BY G. R. PARASURAM, B.A., M.R.C.P.E.

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There is struggle for life both in the animal and the vegetable kingdoms. In this struggle the fittest survive. There are various ways by which this survival is effected. Every individual animal and plant maintains itself against the competition of the rest of the organic world both by offensive and defensive methods. Some animals owe their safety to their speed and agility in escaping pursuit. Some repel by their strength and formidable weapons; some have got defensive armour; some have got a bad odour; some have got an acrid taste of their body. Some escape on account of their colour. Some conceal in inaccessible haunts. Some lead a parasitic life. Some have got enormous powers of reproduction. Some have got very high intelligence. All these factors come into play in the competition for life. In addition to all these, a very successful method of supplementing their natural powers is the living in communities. Man whose natural powers are few, has come to occupy the highest position he holds, mainly because of his communal life, where specialisation of a very high order is possible. On account of this specialisation, he is able to conquer the rest of the organic world.

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The main aim of life is perpetuation of the species. With this object in view, man has developed certain instincts. It is highly necessary for the perpetuation of the species, that reproduction must go, on and on. That is the first instinct, the reproductive instinct. But for man to reproduce, it takes some time. He has to live and grow till then. That necessitates the preservation of man till the period of reproduction. There arises the self-preservative instinct. Apart from these two instincts, there arises in man, a third instinct, the social instinct the object of which also is the propagation of the species. This instinct makes the man look to the good of the community. He works in unison with the rest of mankind. He has to live in society and has to work for the benefit of the society.

He is tied to society by certain bonds, that is by inhibition, control and self-denial. He is not like the man in the desert island, who could do anything he pleases. For the benefit of the community, he has to do certain things and refrain from doing certain things. This restraint is the beginning of the conflict between the social instinct and the other two instincts. Independent action on the part of man, eventually leads to the disintegration of the race. Here arises certain "must nots." (See the Ten Commandments). Though originally all the three instincts were meant for the same end, that is, propagation of the species, from a very early time, the social instinct of conduct was directly antagonistic to the reproductive and self-preservative instinct. The social instinct wants the other instincts to play a subordinate part. Social conduct says: "Sacrifice the individual": the self-preservative conduct says: "No." Of these instincts, the social instinct, being of

less antiquity than the others, is naturally weak. Though weak, its importance cannot be exaggerated as practically that, is the main thing which can successfully perpetuate the species. Hence, normally, the social instinct calls to its aid the self-preservative instinct, and uses it as a weapon against itself. It is this way: The tendency of man is to be anti-social on account of the influence of the self-preservative instinct. But, criminal law says: "Being anti-social, is a crime and crime should be punished." Punishment hurts the man and works against self-preservation. Man is afraid of punishment. So, the self-preservative instinct says: "Deter from crime," that is; "Don't be anti-social. It is to your own interest that you do not fight the social instinct. Conform yourself to society."

Crime consists of acts forbidden by law, that lead or tend to lead directly or indirectly to destroy or injure society. To the extent the social instinct is developed, to that extent crime is diminished. When the social instinct is of a very high order, there is no crime. Look at the example of bees and other insects, where instinctive desires are brought into complete harmony with the needs of the social state. The mothers are idle, doing nothing but producing children and taking enough nourishment. Once their business is finished, they exit. The fathers work, earn and protect, taking only their share of food. As individuals, they do not exist for themselves. They exist for the community.

Insanity and mental disorder are supposed to be identical. They are not. Insanity is much more than mental disorder. According to Mercier, it is disorder of the process of adjusting of self to surrounding circumstances, primarily manifested in disorder of conduct not necessarily of mind. There may be much disorder of

mind, not amounting to insanity. The disorder of mind may be at various levels. Only when the highest level of the mind is affected, does it constitute insanity.

In disorder of feeling, there may be elation or depression. In Agorophobia (fear of open spaces), however much the man knows it is unfounded, he cannot overcome it. Though painful and distressing, this is not insanity, because he has insight into his condition. He has the intelligence to understand (a function at a higher level) that it is unreal, and he takes measures to counteract it. So are the victims of obsessions, with certain extraordinary irresistible impulses compelling them to do certain acts, which they look upon with abhorrence. Because he has insight, he seeks for help to prevent him from acting up to that impulse.

When the highest level of mind and conduct are disordered, insanity exists and here the test is lack of insight. May be that the higher functions are not able to control the lower functions, which run riot, still that they try to correct and control, is enough to prove that the higher levels are still intact, and insanity is not present. Even with a very strong impulse to commit a crime, (he would have committed the offence left to himself), the man with obsessions, has got sufficient intelligence to report himself to the police in time, to prevent his committing the crime as he knows it is a crime.

It is not sufficiently recognised that in very many cases of insanity, disorder of conduct is the first sign and not impairment of mental function. In such cases, an act due to disorder of conduct only, is considered criminal and the man punished; and plenty of instances can be quoted, where the criminal was recognised as insane after conviction in prison, when the mental disorder had

shown itself fully. It is worth while remembering this, when examining criminals, with a view to settle the question of their sanity.

In some criminals, the act is entirely due to a morbid irresistible impulse over which the patient has no control. In true insanity, the insane person does not recognise that either mind or conduct is disordered. "He regards his feelings, judgment and acts as the normal response to his surroundings, for, in him the disorder is in the faculties of judgment and choice, and the rectifying faculties being themselves disordered, rectification is no longer possible."

There are several ways in which the highest functions of mind and conduct are disordered. Disorder of mind and conduct are usually proportionate to each other with exceptions. This disorder may invade whole mind in every department feeling, will, intellect, action, etc., even, to total abolition. Or, it may be one faculty or part of a faculty only, feeling of well being only—or limited as in the field of judgment to a single delusion, leaving the judgment in other fields quite efficient.

It may also vary in depth. Only the main ends that he ought to pursue (judgment) may not be known, leaving him competent in his choice of ways and means; or it may involve his faculties so deeply that he is deprived of ordinary functions, like eating and drinking.

Its duration may vary from a few seconds to a life time. In connecting insanity to crime, all these variations have to be borne in mind. Crimes may be committed as a result of insanity, lasting only few seconds or more and he may never do it again. Crime may result from insanity widespread, affecting every faculty, or from

a single isolated delusion and it may not result from a profound distortion of intellect, feeling and desire.

But, it is in other factors when crime is committed by the insane, that we look for the origin of crime. The insanes are as likely as not to commit crimes as the same people and they are no more exempt from punishment than sane people, unless the crime was a direct outcome of insanity. There are certain special qualities in the insane that favour the production of crime.

A very useful and simple classification of crime will be :

- (1) Crimes of acquisitiveness
- (2) Crimes of violence.
- (3) Sexual offences.

Taking mental diseases without going into a detailed classification, which is not necessary for our present purpose, we can distinguish two main groups. (1) The organic cases, in which the mental deterioration accompanies varying degree of organic disease of the central nervous system and (2) those cases where the disorder is not due to any organic disease, but due to purely psychological causes.

In the first group we can place General paralysis of the insane, senile Dementia and Alcoholic insanity. In the second group, we can place the pure psychoses as Dementia Præcox, Paranoia and maniac depressive or the Psycho-neuroses like Hysteria and anxiety neurosis.

Mental deficiency is altogether a separate entity.

Now, we will proceed to take G.P.I., which is a pathological entity. It is a disease of the nervous system, with distinct physical and mental symptoms and due to the invasion by the *Spirochaeta Pallida*. It is one of the

manifestations of syphilis. The characteristic mental symptom is a progeessive dementia, a failure of the higher functions of the brain in the inverse order of their evolution especially those functions concerned with the adaptation of the individual to his surroundings. A very characteristic symptom of this disease and the earliest to appear is a tendency to criminal conduct. According to the French school of Psychiatry, the initial stage is called (*La Periode medico Legale*). The crimes in later stages, are not common, as most of them are already in asylums.

The commonest type of crime in this disease is the acquisitive crime, carried out in a silly way. He will steal objects useless to him, in the presence of others, or he may forge cheques for huge sums of which he is not possessed. Sometimes these crimes may be committed with a mixture of skill and ineptitude. The acquisitive crimes are always committed by patients of the optimistic or exalted type.

The crime may take place long before delusions of exaltation are apparent and need not be related to the delusions, or may take place in the latter stages, when there are no delusions. Their emotional state is very unstable, and they are easily led away. They explain the motive for the crime, and the next minute give a different explanation. A man who stole a piece of bread from a shop, when asked, said he was drunk, which he was not. Further conversation led to the statement that he was a hard-working man and a T. T. Then he said he wanted to take it to the children as he was a poor man. He contradicted himself by saying he was in business and that he had a lot of money. Lastly he did not know why he stole, and it must have been a joke. This type of crime is also common in *Dementia Præcox*.

Crimes of violence compared to the acquisitive crimes are rare in G. P.

Homicide in G. P. may be divided into 3 groups :

(1) Those where the crime is incidental to the pursuit of an acquisitive or at least an expansive end.

(2) Those where the crime is due to an excessive reaction against external resistance or irritation.

(3) Those crimes which depend on a primary homicidal impulse.

Most cases of violence here fall under group (1). These crimes may almost even in details resemble ordinary crime committed by a sane person and the resemblance exaggerated by his subsequent conduct. But the physical examination of the patient would reveal the presence of his disease. Such crimes may also be due to excessive and out-of-place resentment and irritation. The soldier that had won all the medals in the war would necessarily attack a number of persons who are holding back his decorations. Generally the delusional resentment is short-lived. Sometimes, it may persist for a long enough time to lead to more or less well-conceived acts of violence. A patient offered as a present to his friend, who was getting married, his generative organ, which he believed to possess exceptional qualities. The friend, of course, refused to have it. Soon after this, the patient became impotent, committed a cold-blooded calculated murder on his friend in the insane belief, that the friend had substituted an inferior organ. Due to the excessive irritation caused by the snoring of a neighbouring patient, one patient killed him. In this group may be placed the cases who do violent acts under the influence of absurd suggestions. A paralytic, having heard that death by

strangulation did not occur under 9 minutes, immediately tried to test the accuracy of the statement by chocking a child. In acquisitive crimes and crimes of violence of the first two groups, the disease is of the exalted type.

The homicidal instinct is still rarer and is found in the paralytics of the depressed type only. In such cases, there will often be found an abetting factor such as alcohol or other poisons, senility or the menopause.

To complete this survey of homicide in paralytics, it is to be noted that a man, realising the onset of brain failure and consequent inability to earn a livelihood, may kill his children to save them from want, and may also kill himself—a very rare thing.

Sexual impulses persist and are even exaggerated in the early stages, and lead to crimes of lust, indecent exposure, or grave sexual assaults. But, major offences are very rare. A few of these patients might commit arson.

What are the underlying conditions determining the character of conduct in this disease? Only two kinds of crime come into play here—the common acquisitive crimes, and the rarer violent crimes. “In comparing these two types of crimes, we note that the former are always related to the optimistic form of the disease and the latter, so far as they depend on primary homicidal impulses, also suicidal acts, are related to the melancholic form. Impulses of acquisitiveness are the expression in conduct, as the delusions of exaltation are the expression in thought, of an optimistic emotional tone. Also homicidal and suicidal impulses, and hypochondriacal and persecutory delusions, are manifestations of a depressed pessimistic affective tone. Further, we have to note that, as in all other forms of insane crimes, the impulse is the

earlier and the more constant expression of the emotion, while the corresponding disorder of thought is later in appearing or may not appear at all. We also see that in the majority of cases of G.P., the prevailing emotion is one of optimism and hence, we find a preponderance of the self-acquisitive crime and a rarity of other forms of crime. It is therefore in the conditions which determine the emotional tone in the disease, that we have to look for the source of its conduct disorders, and not on the character or distribution of morbid changes in the brain, which may only determine the quality of excess of the prevailing emotion depression or elation. In normal bodily health, the sane people feel a sense of well-being and satisfaction. Their emotional tone is one of optimism. With a normal healthy physical constitution, the insane have this feeling of well-being, of optimism, exaggerated. That is exactly what we find in the majority of G.P. cases, which is typically a disease of the prime of life. In the early period, they enjoy good health and even to an advanced stage, the sexual glands exercising a potent influence on the emotions, retain their activity. Elation is the natural affective tone."

It leads to impulses, tending to crimes of self-acquisitiveness and delusions of exaltation. And conversely, clinical observation has proved, that in the depressed type there is often visceral disturbance and premature senility and consequent depression and pessimism leading to homicidal and suicidal impulses or delusions of persecution.

In senile insanity in contrast with the above, it occurs at an age of the organism when its vital energy is waning and when the general health is not all that is to be desired. We get a pessimism born of age and tiredness. Depres-

sion is the prevailing mood, and the impulses that originate here tend to homicide and suicide.

The features of senile murder vary according to the degree of disorder of intellect. In profound dementia, it may be due to a sudden impulse without any evidence of past or present delusions. In these cases, there is great confusion of thought and they leave only a vague memory of the crime. If there are delusions, their source, as well as the sudden impulse, is the same disorder of the organic functions.

Some cases may show evidence of more or less deliberation and their details may be remembered when the intellectual enfeeblement is of recent date, so that, it still allows the reflection of the morbid organic state to take shape in delusions which are rudimentary. There may also be corresponding hallucinations, especially of hearing, which abet the crime.

One form of senile murder is that associated with delusions of marital infidelity. In these cases there is always hallucination. He hears voices which tell him the miserable tales of his wife's unfaithfulness and goad him on to murder. The persistence in an exaggerated and morbid form, of sexual instinct in old age, leads to crimes of lust. Here again when it occurs early, only conduct is disordered with little enfeeblement of mind. The only evidence of a morbid condition may be a failure of self-control. Crimes other than homicidal and sexual, are of little importance in these cases.

Alcohol is a poison that produces insanity just like any other poison, whether the poison be vegetable, mineral or animal. All these produce either temporary (functional) or permanent organic disease of the brain.

The insanity produced by alcohol varies with the dose of alcohol. It may be a fatal dose and the man dies in coma. Short of this condition in which mind and conduct are abolished, it produces mental confusion and inefficient movements according to the dose. The first effect is an increase of agility and smartness with decrease of prudence. His speech and action look clever but they are inappropriate. He does a clever thing in a foolish way. On the motor side, the crude movements are exaggerated with a corresponding diminution in finer movements. Later, speech gets thick and the movements—buttoning a coat, holding a cigarette, etc., become more and more difficult. His mind gets more deeply affected and in this stage, different people display their wares in different ways, showing without doubt that the signs of insanity are only partially due to drink and that they are also due to the nature or character of the person drunk. One may be simply stupid, dazed and incapable of much feeling and appreciation and his conduct is much slow. He stares idly without attention or understanding. Another is complaining and weeping, another quarrelsome, another morose, another brags, another gets very much excited.

Depending on this nature, the crimes committed while drunk, differ in their nature also. Besides simply being drunk and disorderly, various other offences are committed.

In the crimes of the drunken insane, the patient repeats the same offence every time. The same features even up to details characterise the crime everytime it is committed. A drunken woman every time she was committed, the crime was that of stealing a bacon.

Alcoholism is insanity. But very few cases are certifiable. And so far as crime is concerned, it is a most potent contributory cause. Ordinary casual intoxication is not an important factor in grave crime. The impulses liberated in the temporary dementia of drunkenness are largely determined as regards character and direction by the state of the organic life, and since that stage is ordinarily healthy in the average drinker, the impulses are more likely to be impulses of acquisitiveness or normal sexual impulses. Of course, trivial external stimuli in these people may produce an exaggerated effect on the emotional tone and provoke a violent and aggressive reaction. Further, as in G. P. I., these people are easily amenable to absurd suggestion. It was proposed in joke, when four people were drinking, that the most intoxicated man should be hanged and hang him they did. It sometimes happens that after a theft or sexual assault, an obscure realization of possible consequences may lead to murder in an unintelligent effort to escape detention.

Pathological drunkenness develops in people who are specially susceptible to alcohol, characterised by a marked predominance of symptoms of intoxication, which depend mainly on interference with higher mental functions resembling very closely the type of disordered consciousness which develops in epilepsy. This special susceptibility may be due to hereditary influences like insanity in the family, epilepsy, head injuries, chronic alcoholism or other mental diseases. The majority of serious crimes due to alcohol are committed in a dream state of drunkenness supervening on chronic alcoholism. The characteristic form of crime is murder and that of wife or mistress with an entire absence of conscious motive and with partial or complete amnesia and fre-

quently followed by suicide. The most common and characteristic form of alcoholic crime with conscious motive is homicide relating to ideas of sexual jealousy. A steady drinker for 25 years developed attacks of delirium with tremours and hallucinations. When drunk, he became irritable and questioned his wife's chasity. After a big bout, he became restless and after a few hours stabbed his wife. Some hours later he developed delerium and was hallucinated. He talked about his wife's conduct, about his bodily condition, saying that his inside was taken out and that half his penis was cut off. Later on he gave a coherent history, but his delusions about his wife were there. The morbid beliefs of this patient in the delerium, ideas of wife's unfaithfulness, of sexual mutilation, and of visceral disorders, form a delusional triad distinctive of chronic alcoholism.

If we observe crimes in other insanities characterised by sexual jealousy, we find that alcohol is always a contributory factor. The delusions rapidly disappear in alcoholics on the cutting off of supplies. But not so in other progressive diseases. The organic disorders of chronic alcoholism tend not only to generate homicidal impulse, but also to give it a distinct colouring and direction. Homicidal jealousy, in any disease has the same organic basis, an initial phase of emotional irritability increase of sexual desire, decrease of sexual power and later, suspicions of marital misconduct. Rationalisation, delusions and hallucinations come next. In women, this jealousy more often tends to suicide. Terrible hallucinations play the essential part in crime due to delerium tremens.

We have in alcoholism a disease of the nervous system, alimentary system and sexual glands. Their

nature and distribution show a corresponding disorder of emotion and intellect. Mental symptoms result from (the special intelligence which the brain has of the disorder of the particular organ—Maudsley), from a pessimistic and malignant emotional tone with suicidal and homicidal impulses and with a specific colouring of morbid impulse and morbid thought in harmony with the special influence of the poison on the digestive and sexual glands. Mental disorders are thus “the psychic signature of the morbid bodily state—in conduct and thought.”

Law does not excuse the drunkard for his offence, but in serious crimes where severe punishment comes in, intention is taken into consideration and hence, criminals of this class are not unduly punished. Some authorities considered that a first offender should receive a punishment of such severity as to make him think twice before he reduces himself to this state of incapacity.

Maniac depressive insanity consists of attacks, of maniacal excitement, or melancholic depression of varying intensity, occurring as isolated episodes in the patient's life, or in frequent recurrence or in alternation. It does not usually tend to dementia. The attacks are extreme oscillations in a permanently unstable and fluctuating temperament which is in itself the source of criminal conduct. Mania is not associated with grave criminality. Homicidal impulse is alien to exaltations, and hence, there is no murder unless it be accidental as in thwarting a maniac who only brags. Barking dogs seldom bite. When a crime is committed in a confused depressive mood, the patient when mentally clear or in excitement refused to believe in the reality of the act. A melancholic

woman put her children into the well, in her maniacal state she believed the children were alive.

In the morbid emotional state of melancholia, there is a hypochondriacal element which causes the man to commit murder. The homicidal tendency is often associated with a suicidal tendency and is an extension or transformation of the latter tendency. The destructive impulse in melancholia is not a protest as in other forms of insanity, but it is an acceptance so that "the impulse is suicido-homicidal and not homicido-suicidal." There is no vindictiveness in the melancholic homicide. He kills his wife out of misplaced pity, because he does not want her to suffer later from want or care. The source of this emotional difference may be some dissimilarity in the extent or nature of the underlying organic disorder or a larger admixture of a pure psychogenic element in melancholia. This difference is interesting in its relation to crime as indicating comparatively minor degree of anti-social significance that attaches to melancholia.

Most of what has been said above apply to the exhaustive psychosis or toxic insanity. In lactational insanity, the child is killed by the mother, who remembers nothing about it afterwards. This amnesia is probably due to the unconscious repression of the painful memory of the crime. Such repressed memory in the process of revival undergoes perversions and a pseudomemory created, in a form to exculpate the patient. A woman killed her child and had lost her memory. On revival of memory, she attributed the crime to her husband.

The explanation for the majority of crimes, especially homicidal in dementia præcox is that "very sudden impulses not explicable even to the patient interrupt the

inner connection of psychic events". This is due to the failure of functional co-ordination which isolates the will from other conscious activities. Here, conduct shows a complete lack of harmony with his emotions and thoughts. The tendency to abrupt irrelevant action which may lead to violence is characteristic of this insanity in all its stages. This morbid impulsiveness is a very early episode in the disease. One form of crime in this disease may be due to easy amenability to absurd suggestion. A man murdered the girl he was engaged to, because, he saw an example of such a case in a newspaper. Crime may be due to hallucinations in these cases as in other diseases. In some cases of murder in the early stage of the disease, crime committed in a state of marked confusion may occasionally produce amnesia. The fits in the early stages of D. P. should not be mistaken for epilepsy. Here again, when crime is committed in the early stage of the disease and the man recovers, it will be difficult to find out the true source of the crime. D. P. is the commonest type of insanity where homicidal impulses are directed against the parent. (Oedipus complex). Of course there may be other types in these cases.

The next class of insanes contributing to crime are the epileptics; not that all epileptics are insane. Invariably their crimes are crimes of violence. All epileptics are subject to lapse of consciousness. They do not know what they are doing and they have no memory of the act afterwards. In many cases, these acts are only equivalents of the convulsions. In a minority of these only are the acts criminal. There is sudden loss of consciousness, falling down, convulsions, coma, and deep sleep. Of these he remembers nothing when he awakes.

But this course of events is subject to variations. The fit may not be sudden, premonitions may occur. Patient may not note the change of his behaviour but others might. He may be moody or morose. Convulsions may not be universal or widespread or very severe. There may be only twitchings or pallor or turning of the eyes. He may not fall down. He may simply stand dazed.—*Petit-mal*.

The important period is the post-epileptic when automatic acts are done,—the period between the fit and the awakening. He retains no memory of such actions. These actions may or may not be criminal, but they are characterised by

“(1) All fits resemble one another in the way they begin and proceed, though they may differ widely in the extent to which they proceed. All major fits or minor fits or a combination of both, but differing in severity.

(2) Automatic action is more characteristic of minor epilepsy.

(3) When such action has followed one fit, the tendency is for such action to come in other fits also. This is fairly constant.

(4) Equally constant that such action is always of the same type in the same case. It has the same general character, not the same action.

(5) The action is usually the caricature of some normal action that is habitual to the criminal, normal action, but wanting in some essential element. If he has a pen in hand, he will go on writing, but forget to dip it in the ink. The woman with a needle will go on sewing without thread. The man that was walking will walk, but heedless of traffic.”

When a criminal act is alleged to have been done in the automatic stage of epilepsy, it has to be shown that the action was of a habitual character or resembles one that is habitual to the criminal. In that stage, man may pass urine—a normal habitual act, but will do it in public. A man cut a child's throat. He was subject to epileptic fits and in the automatic stage he had done acts of violence. Acting of cutting is habitual to a person though cutting of throat is not habitual to any one. The presumption was that he had done it in the post epileptic automatism. It is very difficult to find out cases of masked epilepsy. There are no fits, but at the time a fit is due, he may do some act which may be criminal of which he has no knowledge and about which he remembers nothing. In these cases the epileptic fit is transformed or modified into morbid action.

Atrocious and brutally violent crimes are committed and could be assigned to epilepsy, if there was a previous history of epilepsy. But when there is no history, such violent acts without sufficient motive or any motive are committed, it will be very difficult to prove the source of the crime. It is in these cases, that the expert should go very carefully into all the features of automatism and come to a conclusion whether the criminal act was epileptic or not. This is the kind of crime that is committed in the state of masked epilepsy. Such crimes are brutal and outrageous against persons that the criminal does not know and have no enmity done without motive.

Next in frequency the kind of insanity associated with crime is Paranoia. In this disease, "the patient believes that he is the subject of a plot to ruin him, torture him, to afflict him in various ways either bodily or mentally, a belief constantly associated with a vague mudd-

ing of thought, rendering him unfit to have clear ideas on the subject of a plot and leading him to all kinds of irrational, incoherent and inconsistent beliefs about it." The end will be a desperate deed, which will probably have little relation to the plot and may not counteract it if the plot were true. The paranoic may use violence not only against A, to whom he owes a grudge, but he may assault B, to whom he owes no grudge. Incidentally, such people use violence against persons of importance to bring their troubles to their notice. This is the class that plagues the authorities to death with complaints. They write voluminously.

In paranoia the incidence of criminality depends largely on the degree to which systematization of the delusions has taken place. The prevalence of crime in relation to this disease is much exaggerated. These people are already safe in asylums before the criminal period comes on.

A few words about mental defectives who are classified into idiots, imbeciles, feeble-minded persons and moral imbeciles.

In law an idiot is a person so defective in mind from birth or an early age as to be unable to guard himself from physical danger.

An imbecile is a person so defective in mind from birth or an early age (not amounting to idiocy) as to be incapable of managing himself or his affairs or if he is a child of being taught to do so.

A feeble-minded person is one so defective in mind from birth or an early age (not amounting to imbecility) as to require care, supervision and control for his own protection or for the protection of others or if a child

incapable of receiving proper benefit from instruction in ordinary schools.

Idiocy does not contribute much to crime for the simple reason that they are incapable of it. Feeble-minded persons do contribute. The history of such people will be that they are always soft; not up to much in school; unemployed for lack of intelligence and purpose to earn a decent living; an upbringing without opportunities to develop their capacity and not availing of the few opportunities offered. With the intellectual kink there goes a moral kink. Without a trade or anything good to offer to the public, lacking in intelligence to make work pay, deficient in self control, and with no real sense of morality, they easily take to crime of a petty nature.

Moral imbecile is a person who from an early age, display some permanent mental defect coupled with strong vicious or criminal propensities, on which punishment has little or no deterring effect. The crimes of these people are characterised by their variety, by their wantonness and unprofitableness, by the disregard for consequences, and by the absence of attempted concealment. They are as a class down right liars.

Cases of Encephalitis Lethargica with mental symptoms can conveniently be placed here.

Crime is a preponderance of self-regarding desires and action over social desire and action. It is the pursuit of self-gratification at the expense of the welfare of the society. The difference between the criminal and the law-abiding man lies in the fact, that in one self-indulgence over-powers the social instinct, in the other the social instincts take the upper hand—not the social instinct of a low order, where the man refrains from crime

for keeping the respect of our fellows, for such a man is only removed one degree from the actual criminal, who keeps away from crime for fear of going to jail, but that instinct which creates the inherent repugnance to injure others for self gain. It is the honesty that hates dishonesty, the desire to avoid injuring others in mind or body or estate, the sympathy that is pained by injury done to others, the instinctive aversion to any act that is injurious to the social fabric. Such a man withdraws from crime by internal reluctance and not by external coercion. When we succumb to self gratification and take a criminal course, it is either because our true social instinct is defective, or that we do not realise that the action we take is immoral. The first case is that of the ordinary criminal. The second stands on a different footing.

In the majority of cases, the three motives, *viz.*, the social instinct, the self-regarding instinct and the reluctance that all men have to incur the disapproval of their fellows, are sufficient to safeguard the indulgence of criminal conduct. But, this preponderance of anti-criminal motive may be opposed in various ways. It may be the desire for self-gratification and self-indulgence rises up to a pitch where it overpowers the other motives, *i.e.*, anti-criminal, or it may be that the restraining motives are so weak that they give way before self-indulgent desire of ordinary and normal strength. It is difficult to determine which of these two factors have led to criminal conduct.

It should be remembered that the sense of duty, a social instinct, is innate. Yet, in most cases, it is developed and increased by training and association in early life and that though the sense of duty and the desire to act up to

it is innate, the act dictated or forbidden by it is known by instruction and observation, not so much by innate preferences and aversions. Therefore, a person whose sense of duty has been acquired in a distorted form, might do certain acts from a sense of duty, acts which may be criminal, or if not criminal, at least not moral. A boy's training might lead him to believe that certain acts are quite moral; yet they may not be moral in the ordinary sense. Many public offences originate in this way. The law forbids an act which a person's conscience and training imperatively demand from him. In following dictates of conscience, he offends against law. Thus crime may be due to excessive strength of self-regarding desire or to a distorted sense of duty.

In insanity, there is an exaggeration of desire, desire to do things which may not be advantageous to the actor, but which he may abominate, repel and resist. Still constantly urged by some internal irrational compulsion, such impulses end in various crimes. It may be that the extraordinary desire is to steal, to poison, to kill, or to set fire. In these cases, the motive is not so much for gain as for the gratification in the doing of the act. Such a desire is sometimes morbid not only in this sense, but in the sense that it would bring no gratification to a normal man. Impulses of this kind may induce a man to commit suicide or gratify lust in some unnatural way. Insanity contributes to crime, not by increase of desire only, but also by diverting it into a criminal direction.

Secondly, crime may be due to a defect of sense of duty. Here insanity materially contributes to crime. One of the laws of insanity is that the highest developed and consequently last developed functions of the brain disappear first. The sense of duty, one of the last deve-

loped in man, disappears first in insanity. If it does not disappear, it is impaired. This loss of the sense of duty accounts for the majority of cases of crime. Sense of duty is partly innate and partly acquired through precept, exhortation and example; and if one cannot be blamed for a deficiency in the sense of duty, he cannot be blamed for a lack of sense of duty, because, such sense of duty has not been acquired, though this is not excusable in law. Hence, the question arises whether there should not be a modification in punishment in such cases also.

Crime may also arise from an abnormal development of the sense of duty, where a suicide feels he is unfit to live. His crimes are so stupendous that he, his friends, his country and mankind will suffer on account of his misdeeds, and the only way out is his death. Insanity may reduce the man to a state where the natural consequences of a crime are unforeseen and misapprehended. And idiot cut off a man's head to enjoy the fun of seeing the man's surprise when he awoke.

Recently a very interesting case was reported in which an inmate of an asylum assaulted his own doctor so that he may go to court and prove his sanity. He pleaded guilty, got a conviction and got his discharge from the asylum.

A word about criminal responsibility of insane and I am finished. Responsibility is liability to punishment. The law in India as it stands to-day is as follows: "Nothing is an offence which is done by a person who at the time of doing it by reason of unsoundness of mind is incapable of knowing the nature of the act or that he doing what is either wrong or contrary to law" Sect. 84, I. P. C.

This is practically the same as the law practised in England which originated in the answers to certain questions put by the House of Lords to a committee of His Majesty's Judges. Though these rules primarily referred to crimes by persons suffering from delusions they were in practice extended to include all forms of insanity and hence the words "by reason of unsoundness of mind."

If the law as it is to-day, is interpreted and applied in the strict sense, there will be many a man punished, who probably did not deserve it, but fortunately there is wide variation in the interpretation and application of the law.

The law mentions nothing about imperfectly developed conditions of insanity or border line cases. It is desirable in these cases, to recognise that the disease is a real handicap to the individual and that the criminal responsibility in such cases should be diminished proportionately and not altogether taken away.

It is also desirable that criminal acts done under uncontrollable irresistible impulses should be totally exempt from responsibility, even though the criminal knew the nature of the act and that what he was doing was wrong.

The French law is the most elastic. According to it there is no crime or misdemeanour when the accused was in a state of madness at the time.

Recently in one of the states of America a law has been passed where the power of declaring the question of insanity in a criminal has been taken away from the jury and handed over to a committee of experts. The jury simply gives the findings on the facts of the case.

ON THE EFFICACY OF SANOCRY SIN TREAT- MENT IN THE DIFFERENT TYPES OF PULMONARY TUBERCULOSIS.

AN ANALYSIS OF 84 CASES.

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As a remedy for tuberculosis and for a number of other chronic diseases gold has been used in many of the ancient systems of medicine in India and other countries for centuries, mostly in its metallic, insoluble state, administered by mouth as a powder or as a confection in combination with other drugs. In soluble combination with Arsenic it has also been administered by modern physicians orally, but the use of the metal in organic solution by the intravenous route is of comparatively recent origin.

As a catalytic agent under the names of Triphal, Krysolgan, Aurophos, etc., it has been largely used by Continental physicians in the treatment of pulmonary tuberculosis, but the first rational application of gold therapy in pulmonary tuberculosis based on systematic research was by Moellgaard of Denmark, who about six years ago proved, by experiments on guinea pigs and later by clinical use in human subjects, that Sanocrysin had a definite therapeutic value in experimental as well as in natural tuberculosis in animals and in the pulmonary disease in human beings.

Moellgaard¹ considered that Sanocrysin which had no effect on a healthy animal in moderate doses but

produced reactions with improvement and recovery in tuberculous animals, acted by its chemical effect on the bacilli in the infected foci, directly killing them, splitting them up and liberating their toxins which secondarily produced an anti-bacterial effect by the usual immunizing response of the system as in tuberculin therapy. Moellgaard's hypothesis of the action of Sanocrysin seems to have been supported by the observation that the so-called 'Sanocrysin Shock' could be prevented by the initial or simultaneous administration of an anti-tuberculous serum prepared by the immunization of horses with defatted tubercle antigen or obtained from calves naturally or artificially infected with tuberculosis. In fact, Moellgaard considered that Sanocrysin shock was practically identical with 'Tuberculin Shock' and not a metallic poisoning. Madsen and Morch and some others seem to agree with Moellgaard in the above view.

Le Blanc,² Jessen³ and others do not however agree with Moellgaard and consider that Sanocrysin exerts a purely chemical action on the tissues including the tuberculous foci and that the antibacterial and anti-toxic action is quite secondary.

The chemo-therapeutic nature of the action of Sanocrysin has been questioned by others. It was found by later workers that smaller doses of Sanocrysin than those advocated by Moellgaard could be used with equally beneficial results. The severe reactions and risks of Moellgaard's method could moreover be avoided by the smaller dosage spread over a longer time. Begtrup-Hansen⁴, the advocate of the smaller doses, considers that the action of Sanocrysin is a biological one, resulting from the splitting up of tissue proteins and bacilli in the tuberculous foci; which indirectly promotes phagocytosis

and anti-bacterial immunity. According to this hypothesis it was necessary to spread the treatment over long periods of time to allow the system to develop an anti-bacterial immunity of the type similar to that obtained by vaccine treatment.

A good deal of experimental work has been done in Denmark and in other countries on the part played by Sanocrysin in the prevention and cure of tuberculosis. Cummins and Acland⁵, by experimenting on rabbits showed that the milder the infection the better the results of Sanocrysin therapy. Cummins considers that Sanocrysin shock is a sign of metallic poisoning and that where cautious dosage is employed, shock could be effectively prevented.

The consensus of clinical opinion is now in favour of smaller and more cautious dosage spread over large periods of time irrespective of the total quantity of Sanocrysin administered. The Danish workers gave Sanocrysin in doses of 25 to 100 cgr. at short intervals, a total of 6 grammes being administered in a few weeks. Workers in other parts of the world now employ doses of 10 cgr. or less slowly increased to about 50 cgr. at long intervals and have thereby not only prevented shock but obtained more consistently favourable results.

In South India Frimodt Moller⁶ working at the Arogyavaram Sanatorium has used Sanocrysin in the smaller doses with good results. Of 80 cases treated by him up to 1927, 48 or 60% benefited, but if only such patients as had a fairly complete course were reckoned the percentage of improvement was 66.

In the Madras Tuberculosis Hospital we have always begun with about 10 cgr. and carried the doses up to about 0.6 gramme, rarely exceeding this quantity as a

maximum. The total quantity injected into one patient has varied from 1 to 8.50 gramme the average case getting about 5 gramme. The intervals between the doses varied from one to two weeks depending upon the presence or absence of reactions.

Choice of cases for Treatment.—It is now generally thought that Sanocrysin is of greater value in the earlier exudative cases than in the later proliferative. This appears natural, since the chemical action of the drug will be more evident where the tuberculous foci are not shut off from the circulation by fibrous tissue. Frimodt-Moller considers that whilst the early exudative cases of not more than six months' duration give better results, the later proliferative cases accompanied by fresh exudative affection are also favourably affected.

During 14 months ending 31st July 1928, 84 cases have been treated with Sanocrysin at the Madras Tuberculosis Hospital of which 49 were of the exudative type and 35 of the fibro-caseous type, *i.e.*, cases where a certain amount of exudative change supervened on a fibrosing process. Most of the cases were in stage III with cavities, 13 cases only being in stage II and 71 in stage III. No special selection was made on the basis that Sanocrysin was of benefit in the pure exudative type of pulmonary tuberculosis. The results obtained are therefore of special interest (*vide* Tables I and II). Of the total number of 84 cases, 26 have been excluded in table 2, as these cases had either very little Sanocrysin given them, *i.e.*, less than 0.5 gramme altogether or were treated for less than one month a period too short to enable a decision to be arrived at regarding the efficacy or otherwise of Sanocrysin treatment. As a matter of fact most of these 26 excluded cases had just 2 or 3 of the initial doses

TABLE I.

	Exudative cases.					Fibro-caseous cases.				
	Total treated.	Arrested.	Much Improved.	Improved.	No benefit.	Total treated.	Arrested.	Much Improved.	Improved.	No benefit.
Stage II	12	7	3	2	...	1	1	...	...	...
Stage III	37	7	1	6	23	34	11	3	8	12
Total stages II & III.	49	14	4	8	23	35	12	3	8	12
		29%	8%	16%			34%	9%	23%	
			53% benefited.					66% benefited.		

TABLE II.

*Excludes cases treated for less than one month and with less than 50 cgr.
total quantity of Sanocrysin.*

	Exudative.					Fibro-caseous.				
	Total.	Arrested.	Much Improved.	Improved.	No benefit.	Total.	Arrested.	Much Improved.	Improved.	No benefit.
Stage II	12	7	3	2	...	1	1	...	...	...
Stage III	19	7	1	5	6	26	11	3	8	4
Total stages II & III.	31	14	4	7	6	27	12	3	8	4
		45%	13%	23%			44%	11%	30%	
			81% benefited.					85% benefited.		

of 5 to 20 cgr. and could not with fairness be included in the series. The period of treatment varied as a rule from 3 to 14 months though a few cases treated for 6 to 12 weeks have been included.

It will be observed from table II that whilst 58% of the cases in stage II became arrested and every case in that stage was benefited. 40% only of stage III cases were arrested and 78% benefited. Again whilst 81% of the exudative cases were benefited and 45% arrested, 85% of the fibro-caseous cases were favourably influenced and 44% arrested. These results definitely point to the fact that there is not any appreciable difference in the results obtained from Sanocrysin therapy in the two main types of the subacute form of pulmonary tuberculosis, *viz.*, the exudative and the fibro-caseous. They are in agreement with those obtained by Frimodt-Moller at Arogyavaram, but contrary to what is usually held by workers in some parts of Europe. At any rate there is nothing in them to show that one type of cases is far more amenable to Sanocrysin than the other. In the absence of other contra-indications therefore, every active case ought to be given the benefit of Sanocrysin therapy, especially where artificial pneumothorax is inapplicable as in bilateral implication.

The Effect of Sanocrysin on Tubercle Bacilli in the Sputum.—Of the 58 cases in table II 53 had tubercle bacilli in the sputum and of these 22 became T. B. negative after the treatment, *i.e.*, 41%. It must be mentioned that 8 of these 22 cases had artificial pneumothorax treatment as well and the disappearance of bacilli was most likely due to the collapse therapy. In any case 14 out of 45 cases lost their bacilli by Sanocrysin treatment alone, *i.e.*, 31%.

The Effect of Sanocrysin on cases of different degrees of Toxicity.—When judging the effects of Sanocrysin on cases with different degrees of constitutional disturbance, the maximum daily temperature before the commencement of treatment has been taken into consideration. The cases have been classified into those whose maximum never exceeded 100° F (Class 1), those whose daily maximum varied between 100° F and 101° F (Class 2) and those whose daily maximum was over 101° F (Class 3).—Of the 58 cases treated 23 belonged to class 1, 16 to class 2 and 19 to class 3. It will be seen from table III that under the three headings 70%, 56% and 42% cases respectively obtained remarkable benefit, *i.e.*, were either arrested or very greatly improved. It is therefore evident that Sanocrysin has a better effect in the milder and less toxic cases.

TABLE III.

	Arrested or much improved.	Improved.	No effect.
CLASS I—Maximum daily temperature below 100° F	16 70%	2	5
CLASS II—Maximum daily temperature between 100° F & 101° F	9 56%	5	2
CLASS III—Maximum daily temperature above 101° F	8 42%	6	5

Sixteen out of these 58 cases were under artificial pneumothorax treatment, so that excluding these cases which probably benefited by the collapse therapy and not by Sanocrysin. Table IV gives the results for Sanocrysin Treatment by itself.

TABLE IV.

	Arrested or much improved.	Improved.	No effect.
Class I—Max. below 100° F	11 65%	1	5
Class II—Max. between 100° F & 101° F.	6 55%	3	2
Class III—Max. above 101° F	5 36%	4	5

It will be seen that whilst 65% cases had remarkable benefit in the mild types and 55% in the moderately toxic types, 36% only had similar benefit in the more toxic types. The highly febrile cases of pulmonary tuberculosis are evidently less benefited by Sanocrysin than the milder cases.

The Effect on Body weight in Sanocrysin Treatment.—As in artificial pneumothorax treatment it has been noticed that there is a temporary fall of weight in Sanocrysin treatment in the earlier stages of the course of injections. As the patient's condition improves the weight again begins to increase. Nine of the cases in the series lost weight in spite of more or less improvement by the treatment.

The Accidents and Complications of Sanocrysin Therapy.—As in Tuberculin treatment, the early days of Sanocrysin therapy witnessed a number of accidents including the so-called 'Sanocrysin Shock' or 'Tuberculin Shock'. Such accidents are now known to have been due to excessive dosage and have been successfully avoided by the employment of smaller doses at longer intervals. The anti-tuberculous serum of Moellgaard has in fact not been used in any cases of my series. As will be seen in Table V the usual complications were observed. Fever followed the injection in 39 cases,

being high and attended with rigor in 4 cases. As a rule it subsided by the evening of the day of injection. Albuminuria occurred in 8 cases being severe and persistent in 3, necessitating the stoppage of Sanocrysin treatment. Vomiting was observed in 7 cases and occurred soon after the injection. Haemoptysis as a direct result of the Sanocrysin was seen in 5 cases only, though a much larger number had it in the usual course but not directly due to Sanocrysin. Enteritis was fairly common and a number of vague symptoms like giddiness, throat pain, joint pains, chest pains, etc., were observed in a few cases. Stomatitis of a rather persistent type with ulceration especially below the tongue at the fraenum resulted in 3 cases and there were 2 cases of pigmentative dermatitis, one of which was general, all over the body, and the other over the dorsum of both the feet.

TABLE V.

Complications of Sanocrysin Therapy in 84 Cases.

Complications.	No. of cases.	Remarks.
Fever	39	High with rigor in 4.
Albuminuria	8	3 severe and persistent.
Vomiting	7	
Enteritis	6	Blood passed in 2 cases.
Haemoptysis	5	Not severe.
Stomatitis	3	
Dermatitis	2	
Throat pain	1	
Cough	1	
Giddiness	1	
Joint pain	1	
Chest pain	1	
Gastric pain	1	

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THE TUNING FORK TESTS FOR HEARING

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The tuning fork tests are very important in Otology as aids to diagnosis. They help us to find out the degree of deafness and more important than that to localise the pathological changes causing deafness. They enable us also to determine whether the cause of impaired hearing is in the sound conducting or in the sound perceiving apparatus, *i.e.*, the middle ear or the Internal Ear. These tests are still more important in that, they alone can help us to determine accurately the result of treatment. In making use of the tuning fork tests we must examine the power of perception for the waves of sound passing from the air to the Tympanic Membrane as well as its perception through the cranial bones. The tuning fork generally used for the purpose is, one with 256 vibrations per second. It should ordinarily be provided with a flattened disc shaped end to enable it to be closely applied to the Mastoid region.

The three most important Tuning Fork tests are

1. Weber
2. Rinne
- and 3. Schwabach.

We shall now examine these tests assuming that the deafness is unilateral.

Weber. When a vibrating tuning fork is placed on the ver-tex, part of the sound goes directly to

the Labyrinth or Internal ear. This is known as Direct bone conduction. Another part goes to the middle ear or tympanic cavity. This is known as Indirect bone conduction. From this indirect bone conduction part of the sound goes to the Labyrinth inwards and the other part is reflected outwards. If the external auditory meatus on one side is closed with the finger, part of the sound instead of being reflected outwards is directed inwards and the sound is consequently heard better on that side. The same phenomenon happens with wax in the ear and all diseases of the external and middle ear including perforations of the drum. This is because the waves of sound are transmitted outwards through molecular movements of the ossicles and tympanic membranes and any interference with these movements results in increased hearing by bone conduction on the side, affected. When the tuning fork is heard better on one side by this test we say Weber is lateralised to that side. When Weber is lateralised to the affected side it is a sign of external or middle ear disease especially the latter.

The result is different with Internal Ear disease. Here when the vibrating Tuning Fork is placed on the skull the waves of direct bone conduction go straight to the Internal ear but as this, the sound perceiving apparatus, is diseased all the sound waves are not perceived. The same also applies to the part of sound waves reflected inwards from Indirect bone conduction. The normal side therefore gets more impressions of the sound waves. So here Weber will be lateralised to the sound side. Weber lateralised to the sound side is an indication of Internal Ear disease.

Rinne. This is a comparative test for air and bone conduction. When the vibrating tuning fork is held in

front of the ear-testing air conduction the sound waves go direct to the labyrinth or Internal ear. When it is placed on the Mastoid-testing bone conduction we have both direct and indirect bone conduction, as mentioned above in connection with the Weber test. We have seen before that part of the sound in this is reflected outwards and is therefore lost. So normally in this test air conduction is greater than bone conduction. This is known as Positive Rinne—(+R) *i.e.*, Normal Positive Rinne. Now if there is wax in the ear or the ear is closed or if the middle ear is diseased air conduction will be diminished because there is obstruction to it and bone conduction will be increased because part of the sound that is normally reflected outwards does not go out but goes inwards. This is called Negative Rinne (—R). Rinne negative's pathological. In diseases of the internal ear we get quite a different result. With the tuning fork in front of the ear all the waves are not perceived by the internal ear, as it is diseased. And when the fork is placed on the mastoid also there is diminished perception both for direct and indirect bone conduction. So in Internal Ear disease there is diminution both of air conduction and bone conduction. But all the same air conduction is longer than bone conduction, *i.e.*, this is a pathological positive Rinne. In a pathological positive Rinne the normal relation between air conduction and bone conduction is maintained.

To summarise in positive Rinne we can get the following

1. Air conduction longer than bone conduction= Normal Positive Rinne.
2. Air conduction and bone conduction are both diminished but air conduction is greater than bone

conduction the extent of difference between the two being as in the normal positive Rinne. This may be called a short positive Rinne and is found in mild affections of the internal Ear.

3. Both air conduction and bone conduction are diminished with difference longer than the normal positive Rinne. This may be called a long positive Rinne and is seen in cases of advanced disease of the external Ear.

4. There is yet another possibility where air conduction is normal and bone conduction is absent. This is called infinite positive Rinne and is seen only in hysterical patients.

In Negative Rinne we can get the following

1. Bone conduction increased and air conduction diminished but with very little difference between the two. This a short negative Rinne and is seen in mild affections of the middle ear.

2. Bone conduction increased and air conduction diminished with a much longer difference than above. This a long negative Rinne and is a sign of advanced middle ear disease.

3. Another condition we can imagine here is where bone conduction is present and air conduction is absent. This is Infinite negative Rinne and shows total unilateral deafness. Here on examination the bone conduction is really perceived by the opposite sound ear and the patient thinks he hears with the bad ear on account of wrong localisation.

4. Lastly here we may get a case where Bone conduction is increased and air conduction is diminished. But here both air conduction and bone conduction are

equal. This is known as \pm O Rinne and is seen in some cases of combined middle and internal Ear deafness.

Schwabach.—This is a test based on the comparison of the bone conduction of the surgeon and the patient. The surgeon hears the tuning fork for the normal length of time on his skull *i.e.*, he has normal direct and indirect bone conduction. Now if a patient has wax in the ear or middle ear disease he will hear the tuning fork longer than the surgeon on his skull as has been shown before. So we say here that Schwabach is lengthened. Lengthened Schwabach is a sign of Middle Ear disease. If on the other hand the tuning fork is placed on the head of a patient with Internal Ear deafness—where the sound perceiving apparatus is not normal—he will hear it only for a shorter time than the surgeon. Here we say that Schwabach is shortened. Schwabach shortened is a sign of Internal Ear deafness.

Apart from the above three tests we can also test the patient's power of hearing high and low tone tuning forks. The low tones have very weak power of penetration and are long drawn out. Therefore for the brain, to perceive them they require a transmission apparatus which is provided by the tympanic membrane and the ossicles. Therefore in middle ear disease the patient will not be able to hear the low tone tuning fork. So we say that in middle ear deafness the lower tone limit is raised.

The higher tones have small elongations and great power of penetration. These are normally perceived and do not need the tympanic membrane and ossicles so much as the lower tones to transmit them, *i.e.*, they are easily perceived by the Internal Ear. So if the Internal Ear is diseased the power of perceiving high tones is

relatively bad compared to the low tones. Here we say that the upper tone limit is lowered.

To conclude let us take the left ear.

In middle ear disease here—

Weber is lateralised to the left

Rinne is negative

Schwabach is lengthened

Lower tone limit is raised

Upper tones are good

In Internal ear disease

Weber is lateralised to right

Rinne is positive

Schwabach is shortened

Lower tones good

Upper tone limit is lowered

In total deafness of the left side

Weber is lateralised to right

Rinne is infinite negative

Schwabach is shortened

Lower tones gone

Upper tones gone

MEMORANDA.

CASE OF CONGENITAL ABSENCE OF CERVICAL CANAL, WITH TUBAL AND UTERINE INFECTION.

A married Kavara (low Caste) woman aged about 20 years, resident of Palghat, was admitted into the hospital on 18th August, 1928, for unbearable pain in the pelvis.

On examination of the vagina by speculum it was found that there was no evidence of the existence of a uterus. Vagina itself was capacious and loose. Its dome had no trace of an opening leading to the uterine cavity. On the left upper corner there were two small folds of mucous membrane which hid no opening. In other respects it was normal. There was no discharge from the urethra and it appeared normal.

On bi-manual examination a small central pelvic tumour was detected. It was fairly freely moveable but very tender on pressure.

The general appearance of the patient was one of anxiety and pain. She was bent forwards and could scarcely walk.

The general development of this patient is almost normal except for her pubic hair and breasts which do not show the development proportionate to her age and condition of life.

On enquiring into the family history it was ascertained that she has an elder sister 25 years old with 3 children, and one younger 18 years old married 9

months ago. The latter has normal development and regular monthly periods. She has also two brothers younger to her.

Five years ago she was married. She lived with her first husband for a couple of months. He divorced her for reasons which the patient is not prepared to divulge. She was again married to a second husband four years ago with whom she is still living.

According to the patient once she noticed stains of blood on her cloth during the time she lived with her first husband, and this, she believes, was her first period. She saw once or twice similar stains during the last four years. But she is definite that she had never even for once the same sort of periods as other normal women have.

From the time she was first married she had been having pains in the pelvic region but it was not of a serious nature. It is only for the past two or three months she was unable to do any work.

It is rather difficult to get any definite history of gonorrhœa from the patient but I am led to think that she had it from her first husband from the scrappy statements I am able to elicit from her.

Operation was done on 20th August, 1928. On opening the abdomen an enlarged, angry-looking, hyperæmic uterus—the size of a fairly big-sized mango—was seen. The right tube was very much thickened and it was adherent posteriorly to the uterus and the fimbriated extremity to the colon. The left tube was normal. Both ovaries appeared to be of normal size. The left had a small cyst.

Hysterectomy was performed with the complete removal of the right tube. The uterus had a closed and

dilated cavity containing about half an ounce of pus. The walls of the uterus were very thick and injected. There was no cervix or cervical canal. The lower end of the uterine cavity was conical in shape and perfectly closed round with muscle. There was absolutely no evidence of an existing canal being occluded. The muscle fibres of the lower pole of the uterus spread out and rested on the dome of the vagina. The anterior fibres were scanty and the posterior in fair quantity. The thickness of the so-called cervical portion was about the size of a pencil.

The patient is quite free from pain and is progressing well.

The interesting point in this case is that infection of a tube and the uterus itself has taken place by an uncommon route in the absence of a cervix and cervical canal. Though no bacteriological examination has been made the infection appears to me to be of gonococcal origin.

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A RARE CASE OF SPONTANEOUS RUPTURE OF LUNG.

The patient was a young man of 19 years, admitted with a history of fever and cough for the last 10 months and occasional slight haemoptysis four months back. He used to have frequent night sweats and dyspnoea. His sleep was always a disturbed one. Five days prior to admission he complained of severe pain in the region of his stomach. He soon observed a swelling all round the

neck. He then had a pricking sensation in the throat and could not swallow either solids or fluids.

Condition on Admission.—The patient was much emaciated. He had extensive subcutaneous emphysema all over the front and back of the chest wall extending upwards around the neck up to the mastoid process on either side and downwards to the upper half of the abdominal wall. It was also present as far as the right wrist and the left elbow. There was an anxious expression in his face. The dyspnoea was well marked. Deglutition was almost impossible. He complained of a choking and burning sensation in his throat. His pulse was thready, rapid and weak, about 120 a minute. He had subnormal temperature.

On percussion both sides of the chest were tympanic more so on the left side and the area of cardiac dulness was completely obscured. Auscultation revealed emphysematous crackling all over the front and back of the chest with a few moist rales, and very weak breath sounds on either side.

The skiagram of the chest showed extensive mottling on both sides of the chest. No signs of pneumothorax were evident. The heart was normal and in position. Diaphragm normal on both sides.

An attempt was made to deflate the pleura by puncture. The left pleural sac gave a negative pressure of -14.8 and the right showed only a slight oscillation probably due to pleural adhesions.

Rectal feeding, glucose and saline per rectum and cardiac stimulants were given,

The patient died of cardiac failure 5 days after admission.

Comment.—The peculiarity of the case lies in the fact that the rupture of the lung had taken place most likely near the root of the left lung under cover of the visceral layer of the mediastinal pleura and burrowed its way along the sub-pleural cellular tissue, along the mediastinum and upwards along the Oesophagus and trachea and the big vessels of the neck and from there along the deep layer of the cervical fascia to the axillary fascia and the upper extremity. The site of the rupture is an unusual one as in the large majority of cases the rupture usually takes place over the surface of the lung resulting in pneumothorax and collapse of the lung.

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ABSTRACTS FROM JOURNALS.

Post Operative Massive Collapse.

BY C. R. BOLAND, M.D., AND J. E. SHERET, M.B.

Lancet, July 21st, 1928, p. 111.

A certain percentage of abdominal operations are followed by pulmonary complications especially in males and in upper abdominal surgery. It is not a pneumonic collapse, but is a non-inflammatory collapse varying in degree from lobular to lobar or involving a whole lung. Cardiac displacement is sometimes seen in these cases. The condition is presumably due to bronchial obstruction followed by absorption of alveolar air into the blood stream. The obstruction may be either in the bronchi or in the bronchioles and may be the result of catarrh and of inhibition of the cough reflex due to the anæsthetic. Mortality from massive collapse is low, as pneumonia is a rare complication. The treatment of the condition is symptomatic. The plug of mucus or other obstruction should be got rid of by postural treatment. Morphia and sedatives should be avoided and the aeration of the lung should be facilitated by breathing exercises.



M. K. P.

The Treatment of Haemoptysis in Pulmonary Tuberculosis.

BY CLIVE RIVIERE.

Tubercle, August 1928, p. 509.

Haemoptysis in pulmonary tuberculosis may be due to diapedesis, capillary oozing from congested tissue,

erosion of arterioles or blood vessels or rupture of aneurysmal dilatations. Focal reactions, tuberculin reactions, drugs like arsenic, creasote, iodides, etc., are contributory causes, as also violent efforts, though the majority of cases occur when the patient is at rest. Why some patients bleed time after time and others never in spite of a rapid breakdown of lung tissue is difficult to explain. Possibly as Cornet and others have considered, secondary organisms like spirochaetes play a part in its production.

Regarding treatment, morphine should not be used indiscriminately as it tends to aspiration pneumonia. Codeine, Heroin, Dionin, etc., are better. An ice bag over the heart or bleeding focus is recommended by some, the action being probably reflex. Eating of ice may dilate pulmonary vessels and should be discouraged. Deprivation of blood by hot foot baths, sinapisms, binding the limbs, abdominal cupping, etc., are useful but art very often gets credit for what nature herself accomplishes.

Vaso constrictors like Ergot, Pituitrin, etc., are of doubtful value as they increase blood pressure especially in the pulmonary circulation. Vaso dilators may lessen blood pressure but keep the pulmonary vessels dilated. Hence they are not advisable. Avoidance of excitement and of stimulants is quite essential.

Auto transfusion, the injection of hypertonic saline, Haemoplastin and a number of other coagulants given by injection or by mouth are considered to be helpful, but their value is at best doubtful. The injection of Calcium chloride intravenously has been widely practised but with no better results. The administration of haematinics like alum, lead acetate, gallic acid, perchloride of

iron, etc., is equally futile. Pneumothorax and phrenic evulsion do undoubtedly help mechanically in arresting haemorrhage. Rest in bed, mental assurance, avoidance of cough, and sedatives must remain our rational methods of arresting haemoptysis. Everything done and said, nature does far more in arresting pulmonary haemorrhage than the doctor.

M. K. P.

Causes of the Decline in Tuberculosis Mortality.

BY SIR ROBERT PHILIP AND OTHERS.

Public Health, August, 1928, p. 336.

Sir Robert Philip, Dr. W. M. Willoughby, Dr. E. L. Collis and Major Greenwood addressed the Society of Medical Officers of Health at Bath on 20th April, 1928, on this important subject. Sir Robert Philip began by giving the history of the discovery of the B. Tuberculosis as the causative organism of tuberculosis by Koch in 1882, though Villemin had, during the sixties demonstrated the infectious nature of the disease. The importance of this discovery and of the detection of the early signs of the disease led to the establishment in 1887 of the Tuberculosis dispensary, whose function was not only to diagnose early Tuberculosis but to detect early disease in contacts by domiciliary visitation. The importance of early detection, detuberculization, increase of systematic methods of treatment were recognized in due course. This led to the organization of public health and tuberculosis services.

The decline of mortality from tuberculosis during the 50 years commencing from 1870 has been on an accelerating scale, every succeeding decade showing a

higher rate of decline, quite in excess of the decline of mortality from other diseases. In Scotland for instance the decline in tuberculosis mortality in the decennium 1911-21 was 31 % as against 7 % for the death rate from all causes. This decline has not been uniform in all countries and has varied directly with the anti-tuberculosis activities of these countries. In Europe, Denmark, and in America, the United States, have reaped the benefit of their anti-tuberculosis work. Denmark has the smallest tuberculosis mortality of all European countries. Another interesting fact is that though urban mortality from tuberculosis is higher than rural, the adoption of measures in towns is now tending to lower urban mortality more than rural. It must however be admitted that there are several contributory causes to the decline, including improvement of general sanitation, education, housing and working conditions, wages, working hours, etc., and of industrial conditions generally. The National Health Insurance Act, medical examination of school children, maternity and child welfare movements, general organization of health services, the recognition of the part played by fresh air and sunlight by the establishment of Sanatoria, the elimination of bovine infection by veterinary inspection of dairies, have each and all played their part in the decline of mortality from tuberculosis in the human subject.

Dr. Willoughby considered that the fall in tuberculosis mortality was greatly due to the resistance to tuberculosis developed in the nation during centuries of infection.

Professor Collis laid particular stress on nutrition and wages and on the nature of the occupations in phthisis mortality. Tailors and boot-makers show a

higher mortality from tuberculosis than the general population; the influence of silica dust in the production of the disease is marked; and specific dust damage is responsible for a considerable proportion of middle age phthisis in working people, especially between 45 and 55 years. Factory Acts which curtail the hours of work and regulate other conditions have decreased this mortality during the last 50 years. Lessened disease incidence means lessened infection, which is of great significance in the case of an infectious disease like Tuberculosis. Open cases should as far as possible be segregated in hospitals and Sanatoria.

Major Greenwood considered that nutrition was the basis of tuberculosis incidence. Statistics, he said cannot prove that anti-tuberculosis measures have been the main cause of decline in tuberculosis mortality. As was proved during the war the food supply has a direct bearing on tuberculosis mortality and better wages with better quality of food has been responsible for the lessening of the mortality from consumption during recent times.

M. K. P.

I. Cosmetic Colouring of Cornea.

BY S. R. GIFFORD AND A. STEINBERG.

In American Journal of Ophthalmology, April 1927.

The authors discuss their experimental work on rabbits' eyes and their subsequent trials on human eyes to colour leucomata of the Cornea for Cosmetic purposes with a solution of gold Chloride. The method is easy of application even in the hands of general practitioners and gives satisfactory results with very little or no reaction in

the eye. Solutions of gold Chloride in distilled water have been used in strengths varying from 2 to 4 and even 5%. To minimise the subsequent reaction, the solution has to be neutralised before use, so that it remains only faintly acid; the addition of 2 or 3 drops of N/2 NaOH Solution to 10 c.c. of the gold Chloride solution will be sufficient for this purpose. The solution need not be sterilised as a 1% solution inhibits the growth of ordinary bacteria.

The eye is anaesthetised with cocaine, and the area to be coloured is outlined very superficially with a knife and the epithelium is curetted off. An applicator or swab of sufficient size is dipped in the solution and allowed to remain in contact with the prepared surface on the Cornea for a period of 4 minutes. Overflowing of the solution on to the surrounding area is to be prevented by taking only a sufficient quantity of the solution on the swab, if the swab has dried, it should again be moistened and laid on the Corneal surface for the required period of time. Then 5 to 10 drops of adrenalin solution (1 in 1000) are dropped on the Cornea. The scar becomes faint brown in colour immediately and in 24 hours assumes a black or dark colour. Knapp use a 1% solution of tamin instead of the adrenalin. For Corneal scars over a light brown or blue Iris, a 2% solution of gold Chloride is used for 4 minutes, and for dense scars, 4% or even 5% solution for 4 minutes. The eye has to be kept clean and bandaged up daily till the Corneal epithelium has reformed.

K. K. N.

II. Milk Injections in Gonorrhoeal Ophthalmia.

By IRVING I. MUSKAT.

In American Journal of Ophthalmology, July 1928.

The author gives a review of the rationale, dosage, etc., of parenteral injections of milk, with the object of producing a protein reaction in the patient and states that milk has been proved to be "the most efficacious and practical among all the non-specific proteins". It has been used largely in the treatment of gonorrhoeal ophthalmia by various workers. The author uses milk, which has been boiled for four minutes, in "ten to twenty c.c. doses injected intragluteally on successive or alternate days, depending on the reaction of the patient". "The number of injections and the amount of milk injected depends upon the age of the patient, the urgency of the case, and the severity of the reactions produced". Very few cases of anaphylactic shock have been recorded. The contra-indications for the therapeutic use of milk injections are said to be myocardial involvement, alcoholism, pregnancy, and diabetes. In Scrofulous children there may be a protracted fever for some weeks. As seen in smears and scrapings from bulbar conjunctiva, it has been noticed that the gonococci are destroyed in about 36 to 72 hours. The general reaction noticed after the injections is a rise of temperature and a chill followed by sweating. A marked leucocytosis is produced. The local reaction is a short negative phase followed by a long protracted phase during which the tissues return to the normal condition. There is a reduction of the pain in the eyes, rapid decrease of the chemosis, and oedema of the lids and the discharge from the eyes. Exacerbations met with in some cases should be met by a further course of the injections.

K. K. N.

BOOK REVIEWS.

(*'Incompatibility in Prescriptions'*) by S. K. Mukerji, (Calcutta, Rai Saheb B. N. Mukerji & Son, 1928) is a handy little volume compiled by the enterprising editor of the Indian Medical Record, who has also published other useful volumes, 'Elements of Endocrinology' and 'Infantile cirrhosis of the Liver'. It presents to the reader in a systematic and clear manner and illustrated by numerous examples, the problem of incompatibility in prescription writing and how to avoid such errors. The knowledge of incompatibility is essential for the useful and safe combination of drugs in a prescription. The subject is equally important to the dispensers as in the case of a doctor's mistake they are expected to detect it. Incompatibility in prescriptions is regarded by the students as a dry as dust subject to be committed to memory. In this work an attempt has been made to make the subject as interesting as possible. Especially the chapter on exercises is meant for students and the problems will certainly be interesting to solve. The table of incompatibles will be of help to busy practitioners and dispensers. There is also a well-arranged index. We have no hesitation in recommending this book to all students of medicine and practitioners.

J. C. D.

'Anthelmintics and their uses in Medical and Veterinary practice' by Lt.-Col. R. N. Chopra, M.A., M.D., I.M.S., Professor of Pharmacology Calcutta School of Tropical Medicine, and Dr. Asa. C. Chandler, Ph.D., Formerly Hook worm research worker, Calcutta School of Tropical Medicine. Baltimore: The Williams & Wilkins Co., 1928, pp. 291, with 65 figures. Price 5 dollars.

Col. Chopra is a well known figure in the Medical Research world and to us in India particularly he is known as a pioneer

in the scientific investigation of the indigenous medicinal plants. He has given to us Punarnava, and Kuth and we are sure he will in the course of time unfold to us many of the secrets of the therapeutic agencies of Ayurveda. In the book under review, he has given to us with the help of the Zoologist Chandler a connected and detailed account of the numerous drugs in use as anthelmintics both in human and veterinary medicine. This book really fills a gap that has existed for a surprisingly long time in the literature of therapeutics. The book is well arranged and is divided into three parts. The first part deals with the history and evolution of drugs used as anthelmintics and a survey of the animal parasite of man as well as the lower animals. In the second part, anthelmintics which act in the alimentary canal are considered in detail. In the third part such drugs as are given for their action on parasites outside the alimentary canal are discussed. The work is exhaustive and the chief feature of this book wherein it differs from most of the textbooks usually published in India as well as elsewhere, is that discussion of the action and efficiency of the drugs are based on the personal observations of the authors. India is a good field for a study of anthelmintics and the authors have taken advantage of the material available and have conducted their own research. Having had the privilege of going through the manuscript, the reviewer knows the amount of work that this book represents. Anthelmintics like Carbon tetra chloride and *Oleum chenapodium* which are so commonly used in India are scarcely mentioned in books on *Materia Medica* and the students emerge as physicians without any clear knowledge of their mode of action or their toxic properties. In this book the busy practitioner as well as the student of medicine will find much that is of value. The book is also intended for the use of veterinarians. And there need be no hesitation in recommending this book to students and practitioners alike. No medical library can afford to be without it.

J. C. D.

ASSOCIATION NOTES.

*From M.R.Ry. R. R. Williams Avl., B.A., M.B.C.M., etc.,
Personal Assistant to the Surgeon-General with the Govern-
ment of Madras, To the President, The Madras Medical
Association, c/o Messrs. Hoe & Co., Stringers Street,
Madras, E.*

*Ref:—Correspondence ending with your letter No. 727, dated
12th August, 1927.*

I have the honour to forward herewith a copy of G.O. No. 652 Mis. Public, dated 4th August, 1928, negating the proposal for liberalisation of study leave rules by grant of free passage to the members of the Provincial Medical Service proceeding on study leave.

I have the honour to be.

Sir,

Your most obedient servant,

R. R. WILLIAMS, B.A.,
*Personal Assistant to the Surgeon-General
with the Government of Madras.*

*R. G. 21-8. Copy of Public Department G. O. No. 652 Mis.,
dated 4th August, 1928.*

ORDER.

At the instance of the Madras Medical Association, the Surgeon-General raised the question whether the Study leave rules may be liberalised by the grant of free passages to the members of the Madras Medical Service who proceed to the West on study leave. The study leave rules being common to all services, it has been necessary to consider the question in relation not only to the Medical Service, but also to other provincial services. The Government have, after careful consideration, come to the conclusion that the study leave rules as they stand at present are sufficiently liberal and that no change in them is required.

Minutes of a meeting of the Executive Committee held on the 9th August 1928 at the residence of the President.

PRESENT :—Dr. M. Kesava Pai, *President* ; Drs. G. Srinivasamurti ; P. Venkatagiri ; and K. Koman Nayar.

The meeting which was called to discuss several matters including the proposed send-off to Dr. A. Lakshmanaswami Mudaliyar had to be adjourned for want of a quorum.

Minutes of a meeting of the Executive Committee held on 1st September 1928 at the residence of the President.

PRESENT :—Dr. M. Kesava Pai, *President* ; Drs. G. Srinivasamurti ; P. V. Cherian ; P. Venkatagiri ; and K. Koman Nayar.

1. *Read letter from Dr. A. S. Mannadi Nayar* suggesting formation of branches of the Association at different centres and also the formation of an Editorial Committee for the Association Journal.

Resolved that Dr. Mannadi Nayar be requested to draw up specific resolutions which could be moved at the next Annual General Meeting.

2. *Read copy of letter from Rao Sahib Dr. T. S. Tirumurti* to the Vice-Chancellor, Andhra University, regarding the Rajah of Panagal Gold Medal founded by the Provincial Medical Association and handed over to the University of Madras.

The discussion on the subject was deferred to a later meeting pending collection of further information on the subject.

3. *Read letter from Rao Bahadur Dr. K. Raghavendra Rao* stating that he had ceased to be a member of the Association for many years and that the sum of Rs. 35 collected from him by V. P. Post may be returned to him.

Resolved that the amount paid may be refunded under the circumstances mentioned in his letter and that he may be considered as having ceased to be a member.

Read letter from Dr. Sitaramaswami Nayudu tendering his resignation as a member of the Association.

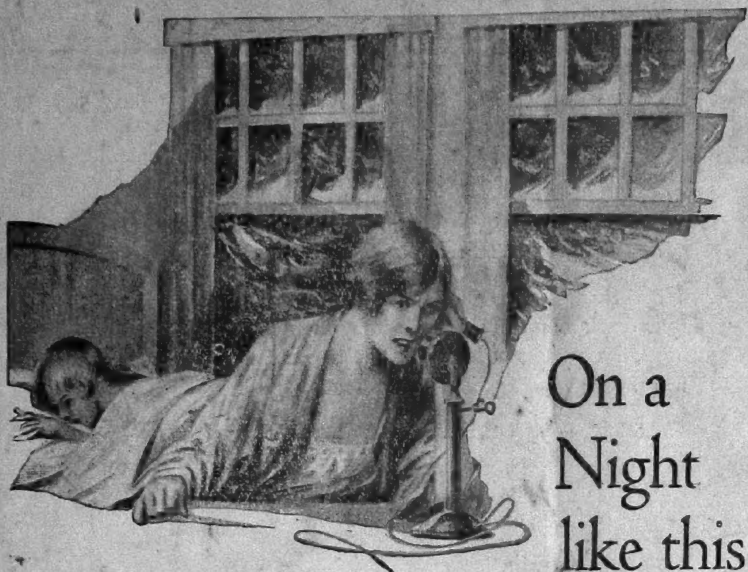
* Resolved to request him to kindly re-consider his decision and continue as a member.

5. *Read letter from Dr. C. Krishnaswami Pillai* requesting that some action may be taken by the Association to get the temporary services of Medical Officers counted for increments of pay.

Resolved that Dr. K. Pillai be informed that all such officers do memorialise the Government individually and send also a copy of their memorial to the President of the Association for taking necessary action.

6. The nomination papers for election of the Office bearers of the Association were scrutinised by the Committee and a valid list of nominations drawn up.

* Dr. Sitaramaswamy Naidu has since decided to continue as a member.



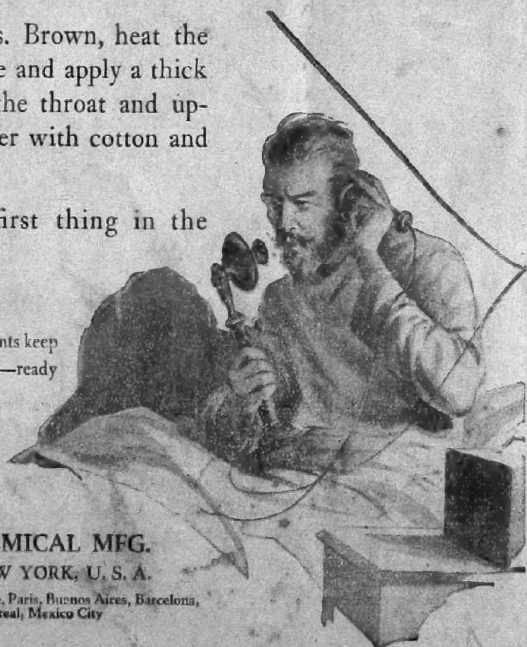
On a
Night
like this!

Yes, Doctor, we have Antiphlogistine
in the house, thank goodness!

All right, Mrs. Brown, heat the
Antiphlogistine and apply a thick
poultice over the throat and up-
per chest. Cover with cotton and
gauze.

I'll call the first thing in the
morning.

DOCTOR, have your patients keep
Antiphlogistine in the home—ready
for emergencies.



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